THE

JOURNAL

OF

THE PHOTOGRAPHIC SOCIETY

OF

LONDON.

CONTAINING

THE TRANSACTIONS OF THE SOCIETY,

AND A

GENERAL RECORD OF PHOTOGRAPHIC ART AND SCIENCE.

EDITED BY

HUGH W. DIAMOND, M.D., F.S.A.

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ALERE FLAMMAM.

THE

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SINCE the last Number of the Photographic Journal appeared, circumstances have caused the Council to make a change in the official organization of the Society. This change we prefer to tell in the language of our literary contemporary the 'Athenæum:' that Journal informs its readers that "Dr. Diamond, whose services to heliographic science are well known, has been appointed Secretary to the Photographic Society. Dr. Diamond has for a long time past been one of the Vice-Presidents of this Institution." From the change in the heading of the Journal of this date, Photographic readers will see that their Journal is no longer announced under the name and auspices of any particular servant of the Art. This change is made in the interest of Photography: causes in the early youth are often supposed to require the sort of support to public confidence implied in the use of certain well-known names. The Photographic Journal has heretofore adopted this course. But the heliographic art has now assuredly, for a long time past, grown beyond the need of individual protection. It is strong enough to stand on its own ground, like the great literary and political journals its contemporaries. The Council have therefore determined that the Journal shall in future appear as the organ of the progress of the Art, and in no way as the expression of individual tastes and opinions. It will appear from this date simply as "The Journal of the Photographic Society," and enjoy all the advantages of an impartial and unobtrusive direction.

The new Editor will hope therefore to receive in his labours a still more active and extended co-operation from theoretical and practical photographers; more than this he need not say. In denying to himself beforehand, from a sense of duty, all the *éclat* that might attend the perpetual intrusion of his own name in the photographic world, he cordially invites all those who love the Art, and who follow it either as a beautiful scientific development of our day, or as a means of artistic culture, to aid him in making the Photographic Journal worthy of the cause in which they all serve. It is a proper acknowledgement, however, to make on the present occasion, that the Journal is indebted to the exertions of Mr. Hardwich for the contents of the present Number.

The Council have resolved to hold an Exhibition of Photographic Works early in January; the studies will be shown to the public either in the old locality in Pall Mall, or in some other equally accessible place. To secure the novelty and interest which ought to characterize every display under the direct sanction of the Society, the Council have passed a unanimous resolution,—

"That no photographs will be admitted that have been exposed in shop windows or otherwise publicly exhibited in this country."

This resolution will of course be strictly carried out by those who receive the photographic works and arrange them on the walls.

This step has been taken thus early in order to give lovers of the Art plenty of time for preparation, and to prevent misunderstandings at the last moment. Further notice will of course appear in this Journal; but any communications for the consideration of the Council relative to the Exhibition should be addressed to the Secretary without delay.

Our readers will be glad to hear, that by the aid of Mr. Delamotte a distinct Photographic Exhibition has been added to the thousand-and-one attractions of the Crystal Palace. The collection is worth an hour's inspection, not only for the idler, but for the practical photographer.

The day is evidently at hand when *no* place of popular interest will be considered to have completed its attractions until it has furnished itself with a choice collection of sun-pictures.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

The same proviso extends to communications to the Editor.

OPTICS.

On a New Stereoscopic Apparatus.

By J. C. D'ALMEIDA.

[From the Comptes Rendus, July 12, 1858, p. 61.]

WHEATSTONE'S reflecting stereoscope was succeeded by the stereoscope with lenses of Brewster. Recently M. Faye has made known a very simple apparatus, or rather a simple arrangement by which any apparatus is dispensed with; and Claudet has discovered an ingenious mode of magnifying the images, and rendering them visible simultaneously to two or three observers.

All these forms of apparatus can only present the phenomena to a very small number of spectators at the same time. The author has attempted to obtain an arrangement by which the images would be magnified so as to become visible at a distance of several metres, whilst the illusion of relief might be perceived from various points of the room in which the experiment is made. He has succeeded in this by two processes:—

I. By means of lenses, the images of two stereoscopic prints similar to the ordinary ones are thrown upon a screen. The projected images are superposed upon each other, nearly in the relative position in which they would have presented themselves if the objects represented by them were before the eyes. These two images form upon the screen an intermingling of lines which only presents confusion; and it is necessary that each of the two eyes should only see one of them—that of the perspective which suits it. For this purpose the author places in the course of the luminous rays two coloured glasses which have no element, or scarcely any element, of the spectrum in common. One of these is the red glass well known to physicists; the other a green glass which he has obtained in the shops. By means of these coloured glasses, one of the images thrown upon the screen is rendered green, and the other red; and similar glasses being placed before the eyes, the green image alone will be perceived by the eye covered by the green glass, and the other to that furnished with the red glass. The relief then appears immediately.

When the observer changes his place before the screen, the phenomenon persists, presenting the modifications which the most simple notions of perspective would enable one to foresee. A very remarkable modification is observed on moving to one side; it appears then as if one saw all the changes which would be perceived if the objects were really in relief. The objects of the first plane appear to move in a direction opposite to that of the spectator, which adds to the illusion.

II. In the second process the two images are kept colourless; each eye is enabled to see the one which is adapted to it, by rendering the production of each image intermittent, and shutting off the sight of the screen, sometimes to the one and sometimes to the other eye, at the moment when the image which it should not see is produced. For this purpose, the light which is to illuminate the stereoscopic prints is previously brought to a focus by converging lenses: in front of the two foci is placed a cardboard, capable of turning round a horizontal axis, and pierced with a circle of holes, which passing in front of the two foci, allow the light to illuminate the two prints alternately. Whilst this wheel turns, the eyes look through the apertures in another cardboard revolving on the same axis, and pierced with holes in the same way. The right eye can only see at the moment when the right perspective appears, and the left eye also becomes free when the left perspective makes its appearance: this may be effected by a small electro-magnetic apparatus.

THE ORTHOSCOPIC LENS.

Letter of Professor PETZVAL *in reply to Mr.* VOIGTLANDER.

To Mr. Paul Pretsch in London.

I CAN assure you, my dear Sir, and I think you will agree with me, that amongst my many experiences I have never met a published article more remarkable in view of psychology than Mr. Voigtlander's letter, published in the *Photographic Notes* of May 15th. He turns, by his exertions in "virtuous" wrath, his assertion of having known the new combination of lenses seventeen years ago, to a perfect absurdity. There is no possibility that a practical optician could keep a lens of such superior beauty quietly and unused during seventeen years, in spite of the want felt long ago.

And for what purpose all his warmth in explaining matters which have no interest to the public, whether they are true or not? What does it matter whether Mr. V. had known a certain production of optics so many

years ago, or not? The question at issue is, does he manufacture good lenses, or bad ones? Are they good—then they are valuable, even supposing he had only yesterday made their acquaintance; but are they bad—then they are valueless, even if he had known them a century ago. And it is precisely the same in all his innumerable statements and assertions. They have no interest for anybody, whether they are right or wrong. Suppose (if it be as he asserts) that the first portrait-lenses had possessed a considerable chemical focus, therefore, having been decidedly unachromatic, and that he had considered it well to preserve this peculiarity,—then I say, "Very well; Dietzler manufactures better ones now, which are achromatic, and which have no chemical focus."

Somebody perhaps may think that the association of my name with the name of Mr. V. is only disagreeable to me because he is not sufficient gentleman for me. I should not like at all that anybody should possess such a wrong notion of my character. I respect every honest man, and I am therefore obliged to declare that the mentioned association is disagreeable to me from another reason, viz. because it is an untruth that Mr. V. has worked according to my calculations; and this is not only an indifferent untruth, but such a one as is practised for deception of the public—a misuse of my name; and I am not only right, but it is my duty, to oppose and contradict this. Mr. V. does *not* work according to my calculations, he does not possess any formulæ or tables, and has not seen any of my calculations. Thinking this of some importance to the photographic public, I may be permitted to enter here into some details.

There are two various modes of executing an optical production. The first one is the way of theory of mathematical calculation. But nobody should imagine that calculating for this purpose is a superfluous formality; on the contrary, it is the main point upon which everything relies. All the dimensions of the new optical production are taken from the principles of science, viz. radii of curvatures, the distances of the lenses one from another; and the most careful accuracy is required, so far that two combinations of lenses of the same material—for instance, lenses for telescopes—may not vary at all in their exterior appearance; nevertheless the effect of both may be so different that one is decidedly good, but the other decidedly bad; the small difference of 1 in the radii of curvatures being only perceivable by the finest measurement. It might be also observed that the optical material, the glass, is a body of no fixed optical properties or capabilities, but varying; and perhaps in a whole century optical glass is not produced twice of the same identity. Therefore the calculator is obliged to extend his calculations over all descriptions of crown and flint glass to be met with in practice, viz. to make a tabula conformable to the purpose, the calculation of which requires a considerable expenditure of time and intellectual power; for instance, a combination of two achromatic lenses requires the labour of four calculators during three months, if a complete tabula which may be relied upon is desired. But if it is obtained, and we are enabled to command the means of science in its higher application for the purpose of investigating the proportions of the glass in refracting and dispersing, then we can find out without much trouble the dimensions of the apparatus to be executed in all the well-known descriptions of glass. It needs only a "common workman," a clever and honest glass-grinder, who is not willing to forge the radii of curvatures only for the purpose of correcting them afterwards again by his own "praxis," and the result will be "quite satisfactory and successful." But the value of the produce remains only as long as the store remains the same; and if this store is exhausted, there must be done from the tabula a new calculation, with all the renewed implements of practical execution, viz. moulds, patterns, grinding dishes, &c.

The second mode of execution is the orthoscopical one. It is not so difficult, but it is supposed that somebody else must have executed the first one before. I have already given a complete description of it in my other letter, and it consists briefly in the following mode: viz. the lenses calculated by Petzval, and ground by Dietzler, ought to be copied so accurately that there appears at best a difference of 3 ins.; but a new graphic name for them must be added. It is possible that sometimes by accident anybody may obtain tolerable results in this orthoscopic mode of production, with the difference founded on the nature of the matter, that the productions of a manufacturer working according to the principles of mathematics are *always* of the same perfect quality, but those of an orthoscopical workshop can only be of a very uncertain quality. It is therefore perfectly clear from this explanation, that only *such* an optician works according to a certain calculation, who possesses either the optical formula and tables, or who has the assistance of a mathematician in possession of these requirements. But any optician who has lost seventeen years ago these tables, or this assistance, does not work any longer according to such a calculation. Mr. V. himself confesses that he is in no way connected with me; he

confesses himself, furthermore, in another paper published in Leipsic, that he has not received from myself any tables or formulæ; therefore he has stated an untruth in his price-list, and anywhere else, by announcing the words "according to the calculation of Professor Petzval," and an untruth which is confessed by himself, from which usage I hereby earnestly request him to desist.

For the purpose of preventing in future any conflict between Mr. V. himself and his virtues, I resign herewith, most solemnly, all my claims to his deference and gratitude; and he himself will kindly abstain from the use or misuse of my name, as I hope, that after this, my public declaration, the public will not believe any further that he is working according to my calculations.

I request you to publish this letter as a reply to Mr. V.'s attack, or defence, as he calls it (judging from this, his defence, I should very much like to see one of his attacks), inserted first in Sutton's 'Photographic Notes' of May 15th; and at the same time I must express my thanks to this gentleman for his very able popular explanation of the mode of operation of my new lens. Such sensible information, important as it is, escapes too often the inventor himself, occupied as he is, and stirring in nothing but integrals and mathematical problems. I consider these contemplations so valuable, that I am almost inclined myself to devote a part of my large work in three volumes, about Optics, for the propagation of more correct notions in that science. Even for the progress of science and art, such endeavours are of more importance than we may perceive at first sight.

The discord between optics as an art and optics as a science is an historical fact, in consequence of which each of them went their own way without minding much the other one. If a man of *science* has discovered, by deep meditation, one of those marvellous productions, he has generally received but little assistance from practical opticians. Newton, Herschel, and Schröder were obliged to construct their reflecting telescopes by themselves. We find only once, and as an exception, both of these qualities united in Frauenhofer, but they diverge afterwards very considerably. I myself experience the same fate, and have been obliged to erect for myself a small workshop, only for the purpose of digging out at least a few of the hidden treasures, which have been conjured into reality in numbers and signs by science,—because the greater number of optical artists alive in Europe possess very little sentiment for these marvels, and prefer to conduct their art rather on the comfortable orthoscopical principle than on the scientific way, which is, at all events, a great deal more troublesome. The protection granted by the law to mental property is perhaps not quite illusive, but it is so expensive, that it costs more than it is in reality worth. In consequence, under these circumstances, there remains only one remedy to prevent the degeneration of a new optical production, constructed according to mathematical principles, viz. *informing the public*. This, however, will not finish orthoscopical optics, but it will submit the same to more caution and care, and therefore they will be obliged to bring their produce nearer to mathematical art. The photographer, who knows exactly what a new lens ought to be, will not be apt to be too easily deceived by an orthoscopist. And if every misuse of the name of the real inventor cannot be prevented, still the same will at least lose much of its injuriousness.

I should like to have this letter published in some of the English papers concerned in these matters, the more so, as I think that perhaps some judicious man of honour might be found who is able and willing to assist me in my efforts of propagating truth in optics by means of popular information.

JOSEPH PETZVAL.

The Plano-convex Lens.

To the Editor of the Photographic Journal.

Jersey, Aug. 9, 1858.

SIR,—Since you were kind enough to insert my letter of March 7th in the last Number of your Journal, but in an imperfect form, several paragraphs having been omitted, may I beg of you to insert the following observations in your forthcoming Number. They relate to the position of the stop in the plano-convex lens, to which I alluded in my former letter, in one of the unpublished paragraphs, unless my memory deceives me. To your mathematical readers these additional remarks will scarcely be necessary; but to others they may appear of some importance.

Referring, then, to the figure of page 252 of your last Number, since a stop must be used with every view-lens of that form, I have to show where to put it, and to prove that its fixed position does not *sensibly* affect the truth of my theorem.

The stop must be placed at such a distance in front of the lens as to allow the most oblique pencils to pass through the lens close to its circumference; for if placed further from the lens, those pencils would be cut off, and if nearer to it, the outside of the lens would be useless, and might be removed or covered up.

Let us see, then, what effect this has upon

the curvature of the image. It is evident, from the demonstration given at page 252, that the foci of the most oblique pencils, as well as of the direct central pencil, transmitted through the same stop, lie upon the same sphere, whose centre is *c*; and as for the pencils of intermediate obliquity, their foci lie upon a curve a little *within* the sphere, but so nearly coinciding with it that in *practice* the two curves may be considered identical.

The introduction of the stop does not therefore *practically* affect the truth of my theorem as enunciated in your last Number.

I trust you will not defer the insertion of these remarks, but assist me in giving publicity to an important fact in the optics of the camera obscura. Yours faithfully,

THOMAS SUTTON.

Remarks on some of the Properties of the Photographic Landscape Lens.
By GEORGE SHADBOLT.

In your last impression you published a paper by Mr. Sutton on "The Plano-convex Lens," in which that gentleman asserts that he has proved the proposition stated in a former letter of his, that "*the image formed by a plano-convex lens having its plane side towards very distant objects, lies on a spherical surface, having the same centre as the convex surface of the lens.*"

If the assertion be intended to apply to a *photographic lens with a diaphragm in front* (and if not, I do not perceive the object of publication in a journal devoted exclusively to photography), it is an erroneous one, arising from a misapprehension or an ignoring of some of the conditions to which a pencil of rays impinging upon the lens is subjected.

The science of optics embraces a very wide field of research, even in its theoretical aspect alone; but when we come to applied optics, there are few men indeed, if any, who are not occasionally at fault upon some particular point of application: this is so completely the case, that even the most renowned in the science have sometimes promulgated statements of opinion capable of refutation by others who have not a tithe of the optical knowledge of the former, but whose energies have been devoted to some special branch of the subject.

Now, the first error committed by Mr. Sutton is his making use of the entire aperture of a single lens, a proceeding that no photographer would think of; but if a diaphragm at a distance from, and in front of it, be employed, then his second error becomes apparent, viz. the statement that "we have now done with the plane surface;" and this leads us by another step to error the third, that "the distance DF" (that from the surface of the lens to the focal point) "is a constant quantity." Surely any conclusions upon such data could scarcely be expected to result in anything sound except by a miracle, and then only by the means taken to produce a good lens, that is, by balancing the errors one against another so as to reduce the residuum to a minimum. If it be contended that the assertion was applied only to a lens without any stop, then the paper has about as much to do with photography as the celebrated disquisition upon "Chinese metaphysics."

It must be borne in mind that what we call the "focal point" is in truth only the "circle of least confusion," and its position differs accordingly as we employ a large or a small angle of aperture; but more than this, with a diaphragm in front of the lens, the oblique rays, or those from the sides of the intended picture, fall only upon the *edge of it*, and with the ordinary apertures used, for these pencils of rays *not any one* of them will pass through the point C in his diagram, the centre of the convex surface.

Now, on reference to Nos. 62 and 66 of the Journal of the Photographic Society, pp. 145 and 217, two papers will be found by Mr. Goddard, upon the course of the oblique rays through photographic plano-convex and meniscus lenses, with an illustrative diagram in the former-cited page. In this diagram are traced out the points of convergence of the extreme rays for an aperture of one-eighth of an inch upon every part of the lens at the same obliquity of incidence, viz. 20°; and by inspection of it, it will be seen that the distance DF in Mr. Sutton's diagram is anything but a *constant quantity*.

This same fact may be visibly demonstrated in a very simple manner by any one who has a camera fitted with a landscape lens, as follows:—Place a lighted candle at one corner of an otherwise dark room, retire with the camera to the side furthest removed from the candle, set up the camera as for taking a view, and turn it so that the *image of the flame is somewhere near the edge of the ground-glass screen*. Focus it as accurately as possible, and fix the whole apparatus so that it shall not be moved. Now *push in the diaphragm of the lens* until it is in contact with the glasses; examine the image of the flame of the candle on the ground-glass, when it will be found to have been put considerably *out of focus*, and the distance between the screen and lens will have to be shortened in order to restore its original definition. The reason is obvious: by pushing in the diaphragm so as to touch

the lens, the image of the candle is produced by its centre, and consequently the rays of light fall upon the convex surface at an angle of obliquity different from that which occurred with the diaphragm in its normal position. It was remarked above, that it will be necessary to shorten the distance between the lens and the screen when the diaphragm is in contact with the glass, in order to restore its *original definition*; but this is not strictly correct, as it is not possible to produce an *equal* degree of sharpness for any given angular pencil of oblique rays when it passes through the centre of the lens, as when it is diverted to the most favourable edge of a photographic combination. In order to ascertain the full effect of the change of place as regards the diaphragm, the camera should be directed towards an object having fine lines, such as distant railings, &c., while these, being brought to the edge of the field, should be examined in both cases by the aid of a powerful eyepiece. Those, however, who are not habituated to performing delicate optical experiments, can form some idea of the effect by simply taking two pictures of the same subject without altering the adjustment of the camera, but by merely shifting the diaphragm as indicated above, and then carefully examining the edges of the two impressions.

My object in this article has been to clear away, if possible, some portion of the haziness of ideas existing in the minds of many photographers relative to the question of large *versus* small lenses, and which the communication of Mr. Sutton appears to us likely to perpetuate, if not to increase; because, if his proposition were a sound one, there would be no reason whatever for having a landscape lens of *any* greater diameter than that of the largest aperture intended to be used therewith. By the use of a lens of considerable diameter, however, having the diaphragm at a distance in front of it, and being of the proper form (that is, a meniscus), not only is the field flatter, and the *definition* at the edges of the picture more perfect, but with any given focal length of lens, a larger surface can be covered properly, than with a smaller lens of the same focal length.

It has been very absurdly supposed by some, that the use of large lenses has been introduced and encouraged by optical instrument-makers with a view to their own aggrandizement, by enabling them to make higher charges for their goods. I say *absurdly* supposed, because not only is the rate of profit far higher with small than with large lenses, but it is also imputing to men of science and mathematical attainments the inability to test correctly the apparatus which their own skill has devised; for it is notorious that comparatively few optical improvements of any moment have originated with the makers of optical instruments.

PHOTOGRAPHIC CHEMISTRY.

On Decomposition in Collodion.

By Mr. Hardwich.

An impression is not uncommonly entertained, that negative collodion which has been iodized for a long time invariably produces more intense negatives than the same newly mixed; and with this idea it has been recommended to iodize for a fortnight or so before proceeding upon a tour of landscape photography. The writer having intimate knowledge of the subject, both from his own practice and also that of some of our most successful photographers, is desirous of giving a caution against the implicit adherence to this custom; for it has without doubt been the cause of many failures. For some months past experiments have been made, almost daily, with samples of collodion prepared in various ways, and the result has always been, that when, by keeping, the free iodine has accumulated beyond a certain point, and the colour has deepened to an orange-yellow verging on red, the negatives become weak and metallic. This result—which is no doubt due to the nitric acid liberated in the film on dipping in the bath—takes place with any collodion, but more readily with some kinds than with others, the difference depending upon the mode of preparing the pyroxyline, as will be shown on a future occasion.

It is not possible to lay down with precision the exact time at which a collodion will have so changed as to be in the best possible state for a given kind of work, since much will depend upon the pyroxyline as above stated, and also upon the ether and the other chemicals. Ether is a complex fluid, and it is not perhaps saying too much to affirm that its manufacture is imperfectly understood. Let several quantities of plain collodion be made from one batch of pyroxyline, but from different samples of the best ether, and after keeping for six months, they will not agree in the rapidity of eliminating iodine from iodide of potassium. Still less will those of six months' age correspond with others recently prepared; and if some have been exposed to the light, the difference will be even more marked. Evidently either the ether itself, or some principle existing in it in minute proportion, is susceptible of chemical change. The following instances are given in proof. A gentleman resident in India, and well known as a suc-

cessful photographer, received a tin case containing collodion. One bottle was taken out and found to be in working order. Not having occasion to use it further at that time, he placed it on a shelf in the room and left it for several weeks. On trying it again, it liberated iodine rapidly and was useless. He then opened the case, and testing the other bottles, found them good, thus proving to his own satisfaction the injurious action of ordinary daylight upon plain collodion. Again, in December 1857, two samples of plain collodion made from different qualities of pyroxyline, were exposed in a glass room with a piece of blue litmus paper in each, corresponding samples having been at the same time put away in a dark cellar. In February 1858, the collodions exposed to light had *bleached* the litmus paper effectually, and on adding iodide of potassium, both became nearly red in the course of half an hour. The corresponding portions kept in the dark were in good working order, although liberating iodine more rapidly than at first; in these bottles the test-papers *retained* their blue colour.

Any sample of collodion, therefore, which it is proposed to employ for landscapes, should first be tried *immediately after iodizing*, and only in the event of its giving a weak picture should the effect of keeping be resorted to. We have taken pains to inquire what plan has been adopted by our most successful exhibitors, but we cannot find that there has been any uniform rule. Some of the finest pictures, and of a very large size, were taken with collodion made from linen pyroxyline, used in less than an hour after iodizing; the bath nearly free from acetate. This preparation of collodion gave great intensity at first, but would not bear keeping, soon becoming dark-coloured. For other landscape views, equally good in every respect, a tough collodion was employed, about a fortnight old and rather slow, but producing good half-tone. A third series again were taken with a collodion very old and insensitive, and with acetate of silver in the bath.

The extreme heat which prevailed about two months since afforded a good opportunity of experimenting on the keeping properties of collodion. Negative collodion, made from calico pyroxyline at rather a high temperature, and iodized with the potassium compound, behaved as follows:—Immediately after iodizing, the bath being newly made and free from acetate, the average time of exposure with an ordinary view lens of 15-inch focus, quarter-inch diaphragm, was twenty seconds. The image after development had a rich bloom upon the surface, and appeared of a chestnut-brown by transmitted light, the sky being fully intense, and showing a tendency to solarize when the tints of the picture contrasted very strongly. After two or three days the required time of exposure had doubled, and there was less definition in the shadows. The quantity of liberated iodine continued to become greater, and after a fortnight's keeping, a stereoscopic picture required three minutes' exposure, and the character of the developed image had completely changed, being of a dull grey tone by reflected light, and slaty with reversed action on the skies by transmitted light. Other collodions differently prepared did not yield corresponding results. One from cotton-wool pyroxyline, rather tough and contractile, and producing a blue negative when first iodized, remained in working order for a month, taking about four times the original exposure, but giving an improved quality of picture.

From these experiments we learn that of two collodions newly mixed, one may produce a rather weak, and the other a strong negative, yet on keeping them for a time they may change, so that the intense collodion becomes feeble, and *vice versâ*.

It is a mortifying circumstance to find, on arriving at a journey's end, that the chemicals are not in working order, and that only a *transmitted positive* can be obtained, which may at any time happen when the whole stock of a collodion of *uncertain composition* is iodised before starting. To meet such a difficulty, we advise that two nitrate baths should be taken, one containing a full quantity of acetate of soda, and the other pure and nearly neutral. Use the latter in preference when possible, as it will be more likely to work free from stains, and in some conditions of collodion the presence of acetate is injurious and favours solarization. But if the quantity of free iodine in the collodion is so great as to produce feebleness of negative, then dipi n the acetate bath, the effect of which will be to neutralize the nitric acid liberated by the iodine, and to substitute acetic acid, thus changing the colour of the negative from a slaty blue to a black. These views are not hypothetical, but are deduced from actual experiment. There will always be a difference of opinion as to the use of acetate in the bath, unless the state of the collodion be taken into the account. No acetate will be needed when the collodion is nearly neutral and gives a brown or red image, but as a remedy for excess of iodine in collodion or of nitric acid in the bath, it will be serviceable; or in fact under any conditions which produce metallic negatives with reversed lights.

It may not be generally known that the addition of a drop of an essential oil, such as the oil of cloves, is a perfect restorative to collo-

dion which has become brown and lost intensity by keeping. This oil was first recommended for the purpose of restoring *sensitiveness* to old collodion, but it has a marked effect upon the intensity of the developed image, as well as upon the time of exposure in the camera. A sample of collodion, which after three minutes' exposure gave shadows without detail, and a transparent sky bounded by hard dark lines, was so effectually cured by a drop of oil of cloves to the ounce, that an image of a ruby-red colour, and fully intense, could be obtained without any addition of nitrate of silver to the developer. It may be questioned, however, whether the employment of an essential oil is a safe proceeding as regards the nitrate bath. We have elsewhere indicated the use of glycyrrhizine in collodion, but the action of oil of cloves upon nitrate of silver is somewhat of a different kind, and more likely to lead eventually to a foggy state of the bath.

On the Preparation of a normal Nitrate Bath.
To the Editor of the Photographic Journal.

10 Pall Mall, Aug. 3, 1858.

Sir,—It may not be generally known that the quantity of nitric acid wrapped up in the interstices of crystals of nitrate of silver varies very much, and of course according to the degree of acidity of the solution from which the crystals are formed. My attention has lately been drawn to this subject; during my investigations I think I have hit upon a method of not only preparing a nitrate of silver bath in a normal state, but also of correcting an old and useless bath which may have become acid, either from being kept in gutta-percha vessels, or from the liberation of acid arising from the decomposition caused by old collodion. The process is as follows:—It is assumed that all crystals of nitrate of silver contain nitric acid in a greater or less degree: fusing, to get rid of its presence, is a clumsy and objectionable method, for it is difficult to fuse nitrate of silver, even in very small quantities, with a view to perfectly driving off the free nitric acid (for which the crystals have a great attraction) without producing a new decomposition or contamination; the object, therefore, is to render inert this free nitric acid. The alkaline carbonates have been suggested: this method, to my mind, is very objectionable: in the first place, a new compound is introduced, carbonate of silver; secondly, if too much of the alkali be added, the strength of the silver bath is impaired; it is also not unlikely that triple salts are formed. The most simple, and therefore the best plan, and one which I find answers invariably, whether the bath be old or new, is to add to the prepared silver bath a small quantity of freshly precipitated oxide of silver; the free nitric acid seizes upon this with avidity, and forms at once nitrate of silver (nitrate of silver being a nitrate of oxide of silver); it matters not whether just sufficient of this oxide be added or a large excess; if the latter, the strength of the bath is not impaired, the undissolved excess being simply left upon the filter. Having treated the bath in this way, it is in an alkaline state, and no picture can be taken with it; fortunately, however, its condition is perfectly normal, for the water which dissolves the crystals of nitrate of silver, dissolves also a specific and homœopathic dose of the oxide used, hence the alkaline reaction. It now becomes a nice point to act upon this atom of oxide with nitric acid: in the first place, the excess of undissolved oxide of silver must be separated by filtration, and to the bright filtered solution add $\frac{3}{4}$ths of a minim of nitric acid, sp. gr. 1·50 to 200 ozs. of the bath; this quantity is sufficient to correct the alkalinity produced by the presence of oxide of silver dissolved in the water of the bath, and at once, as if by magic, a most perfect picture can now be produced: the sensitiveness of the bath is ensured by the known quantity (being minute) of the acid added.

I consider that the presence of this acid, when it can be so nicely calculated as now described, is far less objectionable than the excess of acetic acid sometimes used, this latter being more volatile, and the attraction for nitrate of silver not so strong. The bath, when acetic acid is added to correct the oxide, is subject to change from evaporation or liberation of this acid, due to a want of a powerful affinity for silver which it fails to possess; whereas the nitric acid now recommended, however small the quantity present, is with difficulty got rid of. The object of this communication is, therefore, to establish these facts:—1st, It is best to employ fine and pure crystals of nitrate of silver for preparing the bath; 2nd, to get rid of the excess of acid wrapped up in their interstices by adding to the solution sufficient, or an excess of oxide of silver; 3rd, that the bath so prepared is in a normal condition. 4th, To render it efficient and in working order, $\frac{3}{4}$ths of a minim of nitric acid, spec. grav. 1·50, must be added to every 200 ozs. of the filtered nitrate of silver bath to neutralize the oxide dissolved by the water. 5th, It is very evident that, having corrected the nitrate of silver bath with the oxide, the undissolved excess must be filtered away before adding the specified quantity of nitric acid. 6th. All nitrate-of-silver baths that have

simply become acid and have not been tampered with by other means, can at once be restored by first rendering them normal by means of oxide of silver (freshly precipitated), then filtered, and the stated quantity of nitric acid added. In corroboration of this statement, I have lately got together as many baths as possible that were comparatively worthless, and by this process have rendered them perfect, except in cases where alkaline carbonates and acetic acid have been added. I am therefore led to suppose that triple salts may be formed in this latter case; and if so, they are no doubt a certain source of instability. This is, however, merely conjectural; I have not sufficiently examined the subject to speak with confidence; the question is not now of much practical importance. 7th. I consider that test papers are worthless for indicating either the acidity or alkalinity of the bath. 8th. It is necessary to remember that the oxide of silver must be added in the moist state: I propose preparing both this oxide and acid of known strength, in order that all photographers may at pleasure start as it were anew by bringing their bath first into a normal condition and then adding the acid corrective.

RICHARD W. THOMAS.

PROCESSES.

On a Modification of the Oxymel Process.

To the Editor of the Photographic Journal.

Penllergare, August 6, 1858.

SIR,—Ever since I published an account of my experiments with oxymel, I have devoted all my photographic leisure to the consideration of that and other means of preserving the sensibility of excited collodion films. I believe that I have tried all the many processes which have been recommended for this purpose during the last two years. In my hands oxymel has afforded the best results: it is easy in manipulation, excellent in its keeping-properties, and renders the feeblest gradations of half-shadow with beautiful fidelity. The process is, however, unfortunately not absolutely certain. This uncertainty depends entirely on the variable nature of the collodion used: when this is of an open porous character, the quantity of nitrate of silver retained in the film, even after prolonged washings, is very considerable, and amply sufficient for all the purposes required; but when this texture is firm and structureless, then the free nitrate of silver, although not wholly removed, is too small in quantity to produce a negative of sufficient vigour and density to print well. I therefore recommend the following modification, which I have tested in practical field work for the last two months of unusually hot summer weather, and under a variety of circumstances, which enables me to speak of it with great confidence as ensuring first-class results with ease and certainty. It possesses also the important advantage of working well with any bath or any collodion of ordinarily good quality.

According to my present method, I excite the plate in the usual manner, then wash it thoroughly in waters twice or thrice changed, then plunge into a bath containing 5 grains of bromide of potassium to 1 ounce of water and ½ drachm of alcohol; after immersion for a few seconds in this bath, the plate is to be carefully washed in several waters for about 5 minutes for the purpose of removing all traces of free bromides, and then, while still wet, the following solution, which acts in the double capacity of exciting and of preserving the film, is to be applied in the manner that collodion is manipulated. The solution is composed of

Ordinary oxymel	½ a drachm.
Water	1 ounce.
Citric acid	¼ grain.
Nitrate of silver	¾ „

This is to be poured on and off the film two or three times, and the plate then finally reared up on edge to drain and dry.

One ounce is enough to prepare at a time, being amply sufficient for many plates 10 × 12. It must be carefully guarded from all access to white light, and will keep good for a day or more; but when it begins to show signs of discoloration it is better to throw it away, and prepare a fresh quantity, which is so readily done that the solution may be made and filtered while the plate is in the bath.

Before development, the film should be moistened with water; and then the ordinary pyrogallic solution, containing a few drops of an 8-grain solution of nitrate of silver, is to be applied, proceeding as with wet collodion.

I need hardly observe that, in experiments involving the keeping-properties of prepared plates, a long period is required for testing the exact value of all the many various ingredients made use of, and I cannot yet pretend to say that the formula which I here offer is absolutely the best that can be devised; but I can undertake to recommend this process with great confidence as affording an easy and certain method of obtaining collodion pictures at a distance from the laboratory.

I am persuaded that the principle of washing in an iodide or bromide bath, and then restoring sensibility, and at the same time conferring keeping-properties by means of solution of oxymel or other organic substances, contain-

ing nitrate of silver in conjunction with a powerful acid, will be found the best method of accomplishing the long-sought object of preserving collodion plates.

It will be observed that the above method bears a remarkable analogy to Mr. Fox Talbot's original calotype process; and it was by a careful consideration of the principles he enunciated, that I arrived at what I have found so successful, and here recommend to general practice.

I may observe that plates prepared as above, become, after a few hours keeping, sufficiently hard and dry to bear printing by superposition. I have succeeded in making, thus, some excellent transparencies for stereoscopic slides, holding them in actual contact with the negative, and printing by artificial light; a minute's exposure to a camphine lamp I have found to be sufficient.

In conclusion I would express my desire to lay claim to nothing in this communication, beyond a hearty wish to advance the cause of photography, and to offer unreservedly to my brethren of the camera a process which has already been the source of much pleasure and satisfaction to myself.

J. D. Llewelyn.

P.S.—It should be observed that the film ought to be *thoroughly dry* before the plate is exposed in the camera. Its appearance then is semitransparent, and the substance hard and horny.

To effect this desiccation, it is better to introduce artificial heat into the box or cupboard where the plates are set to drain: a bottle filled with hot water will answer the purpose well.

On Glass Positives.

To F. Hardwich, Esq., King's College.

"433 West Strand, April 26, 1856.

"My dear Sir,—Allow me to dissent from the views expressed in your paper read before the Photographic Society, May 4, 1854, as to the most desirable conditions to obtain direct positives on glass. It is very true, as you then stated, that with a collodion containing a large proportion of pyroxyline and iodide, and a strong bath, it is difficult to prevent the lights being obliterated in the development before the deep shadows 'come out,' and that by reducing pyroxyline and iodide and weakening the bath you do get superiority of surface-definition; yet practice has shown that in working with these attenuated films we are subject in a very great degree to smears, stains, spots, &c., and at best get but a very weak thin picture, and which, by artificial light, it is difficult to see. I say, although by the means you there suggest, as well as in your 'Manual of Photographic Chemistry,' you avoid the former evil, yet the remedy is by no means so perfect as by the use of a *bromide*.

"You will find that the power of a bromide is so great in reducing this tendency of the mere iodide to obliteration of surface-definition, that you may safely indulge in pyroxyline and iodide, and use with impunity a strong bath, provided only that you have bromide enough—nay, more, with very great advantage, for in the thin iodide positive you have a weak though sharp picture, difficult to see at night; by the other you get a strong, sharp, and *soft* positive, having almost the boldness and vigour of a paper print, and capable of being well seen by artificial light, with high lights almost creamy white, in lieu of pale slaty-blue whites.

"The infallible remedy is the bromide.

"For *surface-definition*, the iodide gives a white and black picture, deficient in half-tone (that is, if pyroxyline be sufficient to give strong whites), while bromide gives excess of half tone and absence of high light and deep shadow; the happy medium is the due combination of the two. Again, a valuable property of the bromide is to check the tendency to *irregular* reduction during development, by virtue of some quality the nature of which I will not venture to surmise; so that a bromised collodion is exempt from nearly all those ills that the unfortunate iodised is heir to. It also happily checks the tendency to rapid decomposition, thus allowing a good quantity to be sensitized at one time, and be well settled before used, another incidental element of cleanliness.

"Again, by being able to use a large amount of pyroxyline, such a quantity of silver is retained and reduced that any small amount of irregularity is lost in the general quantity, —quite unlike when you are working with a thin film, where every little irregularity shows because it bears so large a proportion to the rest. To make a collodion for *positive* use, that will bear rough usage, where *a good general result* is required with indifferent manipulation rather than the highest perfection requiring practised skill, let the collodion have full as much pyroxyline as for negatives, and be iodised also as much—iodide of ammonium by preference; let it be *powdery* rather than gelatinous, for gelatinous collodion causes the nitrate of silver on the surface of the plate, when in the holder, to flow into greasy channels, producing corresponding stains in developing. Moreover it does not drain well and uniformly; the solution *hangs* to the surface. Next add a bromide to it; try 2 grs. per oz.; at any rate add as much bromide as you can;

the limit to the bromide is when the picture is grey and flat, with an excess of half-tone and a deficiency of high light and deep shade, otherwise good whites and blacks. The more bromide there is, the more rough usage it will stand. I have not been able to detect any difference in the action of the bromides of ammonium, potassium, cadmium, zinc; but the former is most soluble. Next use a strong bath —40 grains, well acidified: a *large* excess of nitric acid makes it slower, with a loss of half-tone and attenuation of image; but the process is in no degree so sensitive to acidification as the negative. Acetic acid may be added largely without material difference.

"The developer in unskilful hands should be weak; and then it may be used with impunity. I use *Spiller's* formula,—

Sulphate Iron . . .	15 grs.
Nitrate potash . . .	10 ,,
Glacial acetic acid.	20 minims.
Alcohol.	30 ,,
Water.	1 oz.

No nitric acid is needed. It requires skill in its use, and is a questionable good. The above *developer* allows the image to be fairly seen before it is thrown off, taking in cool weather nearly 60 seconds to bring out, allowing the shades of the drapery to be seen. In warm weather it will be better to dilute to one-half with water. It is very important to add alcohol; it allows the developer and surface-silver to mix without staining, and before action sensibly commences.

"It is important to drain well, coaxing off all the solution that will come, and wiping not only back of plate, but corners of slide; and when the plate has been exposed, and prior to developing, it should then again be examined, and the solution that has drained to the bottom should be coaxed off with blotting-paper. When the developer is poured on, it should be done with a bold sweep, so as to carry it not only across the plate to the end, *but over*; there will still be plenty of nitrate solution left in the film. This *washing-off*, by the developer, of the drained nitrate solution gets rid of one of the greatest causes of stains. It is not a good plan to pour the positive developer off and on the plate; keep sufficient on, and let it *uniformly* flow backwards and forwards. Of course there is no need to say the plate must be well washed before immersing in the cyanide; an error in this is shown by the picture getting the *blues*. I don't like using very strong or very weak cyanide, and above all things not *raw* cyanide, that without silver.

"The best plan is, when the old gets exhausted, add fresh lumps and fresh water, but rarely begin a new altogether. Raw, fresh cyanide acts too sharply on the delicate half-tones.

"I have now nearly exhausted my stock of suggestions. The bulk of them may perhaps be classed under the head of 'teaching your grandmother,' &c.; but commonplace as they may be, they are essential to success. But the grand point is the composition of the collodion.

"I have worked this out with great labour and pains, and am in the confidence of some of the best positive-collodion workers in the kingdom, who concur in these views. Moreover, so confident am I in the peculiar properties of the bromides for positives, that I have laid it down as an axiom that any collodion, not reticulated, no matter, scarcely, how prepared, whether originally made from paper or cotton—however iodised, whether intended for negatives or positives, will make a good positive collodion by simply bromising.

"An old iodised collodion, 3 months old, that in a good light, with an iron developer, will in a minute give only a hard face, and no detail, and with 3 minutes with pyro. give less, bromise it, and, though you will not be able to take good and quick negatives, yet in 30 seconds you may take a good positive.

"Though good and quick negative collodion is still rare enough in the market, yet excellent positive collodions are advertised by fresh men every day, all based upon the discovery of the wonderful improvement made in a perhaps indifferent, or worse, collodion by the addition of a bromide.

"I conclude, hoping that the hints thrown out will be useful, and fully assured that, though unsolicited, they will be received in the spirit in which they are written.

"C. J. Hughes."

Notes on Long's Dry-Collodion Process.

To the Editor of the Photographic Journal.

Sir,—In introducing a new process in Photography, it is difficult to induce some to give it a fair trial, and others to manipulate with sufficient care to ensure success. The following hints may be useful to those who practise the Dry-Collodion Process by my method.*

Old waste Collodion is used to clean the plate; and this is done without any difficulty in a cool place, but if the operator should attempt to clean his plate in the glass room, or in a very warm place, he will be inconvenienced by the collodion drying in little specks: the remedy for this is obvious.

The collodion that is suited to the dry pro-

* The Dry-Collodion Process, by Chas. A. Long. Bland and Long, Fleet Street.

cess contains a large amount of alcohol, and is in consequence much longer in "setting" on the plate than the ordinary negative collodion. This condition is liable to give some trouble to an inexperienced manipulator. On removing the plate from the bath, instead of an even coating he may find that the lower part of the plate is covered with a number of transparent spots where there is no iodide of silver; these are caused by the collodion not being properly set before being immersed in the bath. Now let him coat a second plate with the dry collodion, and leave it a long while before immersing it in the nitrate bath, afterwards examining the sensitive film by transmitted light; he will find that the edges and the corner opposite to that from which the collodion was returned to the bottle are not so opaque as the iodide of silver on the rest of the plate: this is an instance of leaving the plate too long a time out of the bath. Two trials should be sufficient to educate the tyro in the proper time that must elapse between coating the plate and its immersion in the nitrate-of-silver bath: an excellent plan in practice is to allow the plate, after coating with the collodion, to drain by the delivery corner on to a piece of blotting-paper; this will prevent the thickening of the film that is likely to occur at the lower edge of the plate, and which is found to be an inconvenience in developing and washing the picture.

The collodion used in the dry process must be absolutely in what is known as a "powdery" condition; otherwise it will be impossible to obtain good results: blistering, washing off of the film, and innumerable other inconveniences will result from the use of a contractile collodion. Old collodion that has become powdery by keeping will not answer, as it becomes sufficiently contractile, on drying, to ruin the best negatives, giving rise, as before stated, to blisters.

It sometimes happens, when large plates are being coated from a comparatively small bottle of collodion, that, after sensitizing, the plates will present irregular patches and "streamers" at the bottom: these are caused by the collodion being over-iodized, and may be corrected by adding a little plain collodion to that already in use, until these streaks disappear.

During the preparation of a number of plates, it is necessary from time to time to ascertain, on the removal of a plate from the bath, whether the film of iodide of silver is in the right state: this is accomplished by rubbing the finger across the plate. If the film gives before it, and the passage is indicated by a transparent space with well-defined edges, you may argue that the collodion is in a proper condition, and that the film of iodide of silver is as it should be; on the contrary, if the finger lays hold of the film, and tears it in passing across the plate, we may know that the film is not in a correct state, and that plates prepared under these circumstances would yield blistered pictures.

Grant that the collodion is of the proper kind, we must look elsewhere for the fault. We find it in the bath: after a great number of plates have been prepared in a nitrate bath, it contains a vast amount of ether, which has been washed off each plate successively; it is this that causes the film to assume the semi-contractile structure pointed out above. The remedy is very simple: boil the nitrate bath in a glass vessel, and filter it, when cold again, into the trough, when it will be fit for use, and give as satisfactory results as it did when freshly prepared.

It will be noticed as a peculiarity of this dry process, that the plates *do not require any washing* after being rendered sensitive; in fact, it has been proved by actual experiment, that plates which have been freed from all trace of nitrate of silver before applying the preservative solution are absolute failures, whereas those in which the largest amount of nitrate of silver could be retained, have furnished the best and most magnificent results.

Many amateurs and beginners at this process fancy that they cannot apply the preservative solution in too lavish a manner; this is an error fatal to success. We merely want to remove sufficient of the nitrate of silver to prevent its crystallization on the surface of the plate when dry. In order to arrive at this end, we measure out in our glass just sufficient preservative solution to *cover the plate twice.*—To particularize—for a stereoscopic plate we use 3 drachms, for a 9×7 plate 8 drachms, and so on; half of these quantities are used to wash off the *superabundance* of free nitrate of silver, and the other half to equalize that which remains in the pores of the film, and to act as a vehicle to prevent its crystallization, and also to give a hard coating to the sensitive surface to prevent injury while the plate is being used.

The only care required in applying the preservative solution is to be sure that it is made to flow off the plate from each corner in succession, in order that there may not be any accumulation of nitrate of silver at these places, which would cause an irregularity in the developement. As a matter of cleanliness, in practice, it is necessary carefully to wipe the backs of the preserved plates quite clean with a piece of blotting-paper or papier-Joseph. When dry, the preserved plates will keep for an indefinite time, provided they are protected

from damp and the influence of sulphuretted hydrogen, which is fatal to them, attacking the silver, and rendering them useless.

These plates have been preserved for twelve months without deterioration; and we see no reason why, with an ordinary amount of care, they would not keep good indefinitely.

As a matter of routine in the operating-room, when several plates are in course of preparation, it will be found a good plan to test the bath from time to time by taking an ordinary wet-collodion negative in it, say after every 12 plates, or more, according to the size we are working on; this will enable the operator to determine whether the bath is giving clean pictures, or whether any alteration is necessary to secure this end.

The time of exposure of the plates must depend so entirely on circumstances, that it is next to impossible to give any definite directions on that head. However, with a single landscape lens 16 inches focus, and with a half-inch stop, from 4 to 5 minutes will be ample exposure on a bright day; with a shorter focus lens, less time will be sufficient, and with a longer focus more time must be allowed. We find, with the double-lens stereoscopic camera with compound lenses, that one minute in sunlight is quite sufficient, and produces dense and perfect negatives.

If we observe, on applying the developing solution, that the picture all "comes out" at once, high lights, deep shadows, and all, we may be sure that the plate has been over-exposed; if, on the contrary, after the lapse of—say 5 minutes, we can only perceive the high lights, we may say of a certainty that the plate has not had sufficient exposure.

The proper time for a picture to show all its details is from 4 to 6 minutes; everything should be "out" by that time, although the development may have to be continued for 20 minutes longer in order to get up the proper amount of intensity. This leads me to notice an error that produces more failures than are dreamt of, namely, that of using a few drops of the nitrate bath to add to the gallic acid in developing, instead of adding the same quantity from a perfectly pure solution; the consequence is that the developer becomes discoloured, throws down a precipitate, and the picture which bids fair to be our finest negative is utterly ruined, being covered with spots and also with a sandy sort of deposit which cannot be removed by washing nor the thousand and one remedies that are recommended to photographers in distress. The mishap thus detailed is caused by the iodide of silver that is dissolved in the bath being precipitated when it is mixed with the gallic-acid solution; the gallic acid then decomposes it, and the results follow as shown above.

The same effect is brought about by washing the developing glass out with common water before use, and neglecting to dry it; on the addition of the nitrate of silver, a chloride is formed, on which the gallic acid exerts its influence, to the great detriment of the picture and the disappointment of the operator.

During the development of the pictures produced by my dry process I have sometimes noticed a peculiar marbled appearance in the skies, which does not extend to the details of the picture. I have in my possession a remarkable instance of this marbling, in which the line of the houses against the sky is repeated in a most extraordinary manner. There appears to be a thickening of the deposit near the object, then a comparatively clear line, and again a thickening corresponding exactly with the outline of the building, and then the general marbling appears to hold its own.

I am inclined at present to attribute this curious effect to allowing the developing solution to remain on the plate for too long a time without gentle agitation by blowing on the surface, or otherwise, as I have invariably found that neglect of this precaution has resulted in the marbled appearance, whilst attention to it has almost invariably prevented its occurrence. I merely mention this peculiarity of development in order that those who are following the process may anticipate meeting with it—not that it injures the picture in the least, for, by continuing the development sufficiently long, it is entirely obliterated, and, further, it never appears in the picture itself, but is always confined to the sky.

I would caution beginners against rejecting a negative in which all the details are apparent, but are too weak to be of service for printing. Let them rather continue the development for a longer time, until they have quite determined that no good result will follow; for I well remember in my early trials with the dry process, that many most promising results were rejected by me from want of patience and a knowledge that the development of a photographic picture can be continued *ad libitum* until every part where silver is deposited becomes as opake as a piece of metal.

I fear, Sir, that I have occupied too much space; but I trust that many of your readers will find some assistance from these desultory notes—notes extending over a considerable period, and having reference to difficulties that have been brought under my notice by amateurs and others who have been practising this dry process. CHAS. A. LONG.

Photography, Artistic and Scientific.

By Henry P. Robinson.

In looking through the four volumes of the Society's Journal already published, we find a large mass of information relating to the science, but scarcely a word on the art of photography. It would almost seem as if the followers of this delightful pursuit were not aware that they have the opportunity of conveying thought and feeling, equally as much as painters and poets. Photographers must not suppose that any unusual amount of talent or genius is required to make them successful; they have only to study their subjects carefully with a view of removing a few of the most glaring faults (visible to all after the picture is finished), and they will produce very respectable works. I believe the time will arrive when we shall look upon the pictures we now think so much of, as we do on the crude efforts of the early painters, acknowledging their perfection of finish, their beautiful tone, and their great truth, but at the same time being conscious of their stiff and cramped forms, their vacant expressions, and many other faults. The column and curtain backgrounds have nearly disappeared; other errors will follow; and as our knowledge increases, photographs will become fine works of art, taking their position with the best works of the best painters.

I much regret that this subject has not been taken up long ago by some of our most eminent photographers. But in the absence of abler pens, I will endeavour to offer a few hints on the composition and arrangement of figures, with the hope of inducing photographers to think as much of what they mean to do, as of the means of doing it; for however good in execution photography may be, it is worse than useless if employed on a badly-arranged subject.

But before I proceed further, I have a few words to offer on the best mode of taking negatives, although the subject is nearly worn out. It is a curious fact that few amateurs know what a really fine negative is; many suppose that if a negative is intense, it must be good: this is quite a mistake; the densest part of a portrait negative should not be quite opake, but sufficiently transparent to show a brilliant light through it: the darkest black should be nearly or quite transparent, the intermediate tints varying infinitely between the two extremes. A good negative will give all the details of black drapery without in the least overdoing the whites. A lady's white muslin dress is not a mass of blank paper, as we so often see it represented in untouched prints, but is full of the most delicate details of light and shade; and it can be perfectly produced without in the least damaging or neglecting other parts of the picture. I think so very much depends on the picture containing the exact balance of light and shade as seen in nature, that I will endeavour to explain a method of working which I find very successful, although it varies but little from the mode usually employed.

The Silver Bath.—Take 12 drachms of the purest nitrate of silver and melt it slowly in a porcelain cup over a spirit-lamp, removing the lamp the moment the crystals are melted, or there will be danger of converting the nitrate into nitrite. When the silver is cold, dissolve it in 4 ounces of water in a glass vessel, in another vessel dissolve 3 or 4 grains of iodide of potassium in 1 ounce of water; add the iodide slowly to the silver until it will no longer redissolve the precipitated iodide of silver; then put in 3 or 4 drops of glacial acetic acid, fill up with distilled water to make 20 ounces in all, and filter. This bath should work well; but as the quality of nitrate of silver varies, it will require a few more drops of acetic acid if the picture fogs.

The Collodion.—I often find amateurs in trouble about their collodion, but we can now get it made so perfect and so thoroughly to be relied on, that this difficulty no longer exists. I have used a collodion manufactured for me by Mr. Hardwich; it produces a soft and sharp image, with delicate half-tints quite free from blank patches of black and white, is very quick in action, and if intensity is required, it can be produced to any extent by continuing the development. If the collodion becomes thick, opake lines are sometimes seen in the negatives; this fault can be removed by the addition of a small quantity of a mixture of ether 6 drachms, alcohol 2 drachms. Alcohol and ether in the bath will sometimes cause these lines, but as they are useless they should never be added.

The developing solution:—

Pyrogallic acid..........	10 grains
Glacial acetic acid	4 drachms
Water	10 ounces.

This developer contains a larger proportion of acetic acid than is usually employed; the acid prevents the high lights from being overdone before the shadows come out. It contains no alcohol, as it will be found to flow perfectly without. The image should appear *slowly*, the shadows and high lights appearing nearly simultaneously; when partly developed, add one-third water to the developer; this weak solution will be found to increase greatly the sharpness of the picture. If sufficient intensity does not occur in two or three minutes, add a few drops of the bath, when any degree of density may be obtained.

Dissolve the unaltered iodide in the usual way with cyanide or hyposulphite of soda.

[To be continued.]

[The collodion alluded to in the above article was prepared purposely to meet the views of Mr. Robinson and other portrait operators who object to very intense negatives. Its peculiarity depends *upon the temperature of the nitro-sulphuric acid*, which is kept at 130° when extreme sensitiveness, with small intensity, is desired. To show, however, how much depends upon the condition of the nitrate bath and of the chemicals generally, it may be mentioned as a fact, that some who have tried this same collodion have altogether failed with it, obtaining only feeble pictures covered with white spots. Others, again, have found it to fog completely on the first application of the developer. No process will be uniformly successful unless the proper balance between the various solutions be maintained.—Ed.]

Notes on Russell's modification of Taupenot's Process.

[Communicated by the Editor.]

Many of our readers are doubtless unaware that this modification of Taupenot's dry process, although published for the first time in our last Number, has been tested by individual friends of the inventor during a period extending over eighteen months. It is not too much to say, that many negatives taken by it are fully equal to the best works on wet collodion. They have nearly all the softness and half-tone, with even greater distinctness of detail. We ourselves have seen it worked throughout the whole of the summer with success. The manipulations are troublesome, but the plates will bear almost any amount of rough usage. Those who practise Taupenot's process in localities where the water contains saline matter, will at once appreciate the action of the gallic acid, which is applied to the plate before exposure; it preserves the opacity of the sky even when the free nitrate of silver has been perfectly removed.

The following queries were addressed in the first instance to Major Russell. We publish them *verbatim*, together with his replies.

Query 1. Have you made any comparative experiments as to the keeping properties of plates prepared with and without the gallic acid? and for what length of time do you consider that these plates may be depended upon after sensitizing?

A. I have only once tried the keeping qualities of plates prepared with and without gallic acid. This was about February 1856. The plates were put into the same box and kept three months before exposure. On being developed, the gallic acid plates came out well and clear, with the exception of light yellow staining near the corners; those without gallic acid stained yellow all over. This experiment is not conclusive, as the plates were not thoroughly washed from nitrate of silver, and the box did not exclude light *perfectly*. With respect to the time the plates will keep after sensitizing, I can only say that I have never found any deterioration from keeping. About the end of June 1857, I prepared twelve plates with gallic acid, and used seven of them within a week or two; the remaining five were exposed about the beginning of last May. One was spoiled by careless development, and being a duplicate was rejected; the other four developed perfectly bright and clear, without the slightest symptom of fogging, and appeared more sensitive than those which were used soon after being prepared, though I might be mistaken in this. These plates were kept in mahogany slides, and carefully secured from light. I believe that plates prepared with gallic acid may be depended on for many months if not exposed to any injurious influence, such as keeping them in a deal box. I have not yet tried the effect of long-continued high temperature, but do not imagine that it would cause any injury if the plates were kept in tin boxes.

Query 2. Is it safe to keep them after exposure, but previous to development?

Query 3. Would you prefer, if making a tour of landscape photography, to take with you a stock of plates *half prepared*, or to sensitize fully, developing at the time or on your return?

A. I would prefer to take the plates fully sensitized, and to develope as soon as convenient after exposure. I have not found any ill effect from keeping the plates between exposure and development, but do not recollect having tried it for more than a week or two, since I prefer developing as I go on, to see whether the exposure was rightly timed.

Query 4. Have you had any experience in this process with hard water containing carbonate of lime? and would the employment of gallic acid enable you to obtain a good quality of negative with such water, or with water containing salt?

A. I have used hard water containing carbonate of lime and salt in different places, and never observed that it caused any ill effect when gallic acid was employed; but it is necessary to wash the plate after excitement, the first excitement especially, with a small quantity of distilled water, or at any rate some water which

does not precipitate nitrate of silver strongly, otherwise insoluble salts of silver adhere to the surface, making rough places, which cause uneven development. If the water contains much salt, it is better to wash the surface with a small quantity of distilled water, after soaking in the hard water, and before pouring on the gallic acid. With many kinds of spring-water this last is not necessary.

Query 5. Do you find the peculiar yellow-green colour of these negatives an objection in the printing process? It has been proposed to alter the tone to a shade of blue (probably by the employment of a salt of gold), and so to diminish the excessive opacity: would this plan be feasible?

A. I do not find the yellow-green colour at all objectionable for the printing process. Positive transparencies are very much improved in appearance by toning with *sel-d'or* before fixing. Some negatives are also improved by the same treatment, for it increases the opacity of the high lights and gives rather more contrast of light and shade, and prevents fading in the hyposulphite. This is useful in the case of over-exposed and under-developed negatives.

Query 6. What is your experience as regards certain markings like the convolutions of the brain, common in this and other dry processes?

A. These markings are, I believe, produced by the partial gelatinizing of the collodion, from its containing too much alcohol. If it will not bear enough ether to prevent this defect without blistering, it is not fit for the process.

These markings may be seen before exciting, by examining the surface of the collodion by reflected light at a small angle, in the form of hummocks and ridges. After excitement they may be seen by transmitted light, the pattern being traced in greater and less opacity. Pouring the collodion too slowly off the plate will often produce the appearance, by allowing too much ether to evaporate. If the plate be coated with thick albumen, it will often produce a perfect negative, when if thin albumen be employed, the mottled appearance will entirely spoil it, the same collodion being used in both cases. If the mottling be not very strongly marked in the collodion, and the albumen not too thin, it may often be entirely prevented from affecting the picture by pouring the developing solution on and off continually, as soon as it begins to discolour.

Sometimes, when the sky is solarized and mottled all over, and the rest of the picture free from this appearance, one of the lines will follow the outlines of trees or buildings. I cannot account for this, unless it is caused by the line of greater intensity and thicker deposit of silver which is generally seen on the edge of a solarized sky.

Query 7. How do you proceed to avoid blistering of the film?

A. Blisters are best avoided by using a collodion which will not easily produce them. It is usual to recommend drying the plates quickly. A better plan would be to prepare a plate for trial, and after the second excitement to place it in a dish of water for at least six hours, and if blisters appear, to reject the collodion as unfit for the process. If the albumen be used without any substance which retains water, drying the plates by artificial heat before exciting the albumen appears to prevent blisters. If sugar or treacle be used with the albumen, the quantity should be about 60 grs. of the former, or 30 grs. by weight of the latter, to the ounce. If less be used, blisters can hardly be avoided; if more, sensitiveness will be much diminished. Nitrate of magnesia, 60 grs. to the ounce, is, I think, better than either. If any of these be used, the plates should not be dried by artificial heat before the albumen is excited. Glycerine will not answer well in the albumen; it greatly diminishes sensitiveness, and often produces on development a beautiful purple colour in the transparent parts of the negative: I have seen the same effect produced by mixing it with metagelatine for the dry collodion process.

C. Russell.

MISCELLANEOUS.

Mr. Long's Dry-Collodion Process.

To the Editor of the Photographic Journal.

16 De Beauvoir Terrace, Culford Road, N.
Aug. 9, 1858.

Sir,—At this season, when photographers are actively preparing to scour our own as well as other countries in pursuit of this delightful art, the following fact will be interesting and important:—

A plate prepared by one of the dry processes in July last year, and preserved with no special care to this time, has been found to give results but little inferior to those which were used shortly after preparation.

I prepared this plate with several others according to the method of Mr. Long, of Fleet Street, took it to Belgium, brought it home again, and, not having any opportunity of using it till last week, I of course considered that it would be useless; out of mere curiosity, however, I exposed it, and was astonished to find it as sensitive as plates newly prepared, and giving, as before observed, a picture but little inferior to them.

The exceeding simplicity of "Long's Process," in which no washing of the plates is required after sensitizing, and the retention of sensitiveness for a long time after preparation are advantages of so great value that I am anxious to direct the attention of photographic tourists at once to this process; and knowing of no other means of communicating with my fellow-labourers in the field in so expeditious a way, I trust you will be able to find space for this letter in your valuable Journal.

G. R. SMITH.

Yellow Glass for the Developing-room.

To the Editor of the Photographic Journal.

32 High Street, Bristol, Aug. 14, 1858.

SIR,—A peculiarity connected with the orange glass used to light the operating room has recently come under my notice; and as I believe the fact has not been before observed, its publication may prove interesting to your readers.

My operating room has been built about five years, and is lit with two pieces of deep orange glass stained with oxide of silver, and selected from a number of samples, by actual trial over a piece of sensitive paper exposed for several hours to light in a pressure-frame, so that I have the best means of knowing it was originally good; and besides, it has been in constant use ever since with perfect results, and I have been able to work with the shutter of one of the pieces 15 × 12 quite down, so that I had plenty of light. During the past week I discovered the glass had lost the power of keeping out the actinic rays, and that the picture fogged all over under development. At first I suspected my chemicals, but having satisfied myself on that point, I had the glass removed and a new one inserted, and can now obtain a picture perfectly free from fogging.

There appears to be no fading in the colour; for when the old and new glass were examined together, I could detect no difference in them.

It would thus appear that the power of keeping out the actinic rays of light is not due to colour alone, and that it will gradually, by long exposure to light, lose this power.

THOS. C. PONTING.

Moulded Dishes for Developing Dry Plates.

To the Editor of the Photographic Journal.

Manchester, Aug. 12, 1858.

SIR,—At your request I send a description of the moulded glass dishes which I have had made for the stereoscopic glass plates.

The dishes are ⅜ths of an inch in depth, and will contain one plate of the usual stereoscopic size. The bottoms are flat; and in each corner there are little elevations formed by the mould to prevent the glass plate from touching the bottom of the dish: the advantage of this is, that you can excite or develope with the coated surface of the plate downwards, and thus prevent any deposit resting on the sensitive surface: a slip of gutta percha, or a silver wire bent at right angles, enables you to lift up one end of the plate, and thus prevents the necessity for fingers coming in contact with the solution. I generally have a number of pictures developing at once, to save time. Constant attention is not requisite if a weak developing solution be employed; and card-board covers may be placed over the dishes to prevent dust or light getting access to the pictures.

The dishes may be used for exciting or fixing, as well as for development; and as a few ounces of solution is sufficient, it becomes a convenient mode of preparing plates when a small number is wanted. The dishes are easily cleaned with dilute nitric acid.

J. B. DANCER.

[We have found so much advantage from the employment of the developing dishes above described, that we hasten to recommend them to our readers. They may be obtained of Mr. Dancer, 43 Cross Street, Manchester, at eighteenpence each.—ED.]

Vulcanized India-rubber Gauntlets for Photographic Purposes.

To the Editor of the Photographic Journal.

58 Charing Cross, London, August 15, 1858.

SIR,—The gloves which we supply are made of an elastic cotton fabric, coated externally with a thin sheet of vulcanized india-rubber; they reach to some distance up the arm. The caoutchouc being vulcanized, is not affected by heat, acids, &c. in the same degree that it would be if not so prepared. The elastic cotton lining gives the necessary strength to the glove, renders it more easily put on and off, and facilitates manipulation.

MATTHEWS & SON.

[We advise those who suffer from the annoyance of acid fumes in preparing pyroxyline to use the above gauntlets. An increased demand would doubtless have an effect in reducing the price, which at present is nine shillings and sixpence per pair.—ED.]

ANSWERS TO CORRESPONDENTS.

GENTLEMEN desirous of admission into the Photographic Society, are requested to communicate with the Secretary, 1 New Coventry Street, Piccadilly, W.

A. Greenland.—The lunar caustic of commerce is rarely sufficiently pure for photographic purposes. Makers of nitrate of silver would be likely to throw

any crystals which appeared of doubtful quality into the melting-pot, and if organic matter were present, nitrite of silver would be formed. This is probably the cause of your difficulties; and we recommend that if you cannot get the best fused nitrate, the ordinary crystals pulverized and dried at 280° Fahrenheit, as advised in the May Number of this Journal, should be substituted.

P. Turner.—"Why does plain collodion turn rapidly red on adding the iodizing solution, when the ether from which it was made shows no signs of acidity?" We answer: perhaps because you have exposed it to light, and it has become ozonized. Try the effect of changing the iodizer and using cadmium.

J. R. O.—You may obtain a glass positive with good whites by working with a collodion containing bromide, developed with a mixture of sulphate and nitrate of iron. Read the letter of C. J. Hughes in the present Number; you will find it quite to the purpose, and full of useful hints. Sutton's "Positive Process on Glass" is a work which we can conscientiously recommend.

A.—We can only suggest that the albuminized paper may contain a portion of free alkali, and that this, re-acting upon the nitrate of silver, occasions the discoloured deposit. When the albumen is dissolved by the nitrate solution, you will usually find, on putting in reddened litmus paper, that the bath is alkaline. Do not omit also to take the strength of the bath, as a deposit will sometimes form when the proportion of silver falls too low to coagulate the animal matter.

W. R. P.—Try the modification proposed by C. Russell in the last Number, and give nearly double the exposure usually recommended. This will effectually remove the chalkiness, and bring out the shadows with great distinctness. Collodio-albumen plates may be fixed a week or a fortnight after developing, if required.

Inquirer.—To obtain permanent prints by a simple process, use albuminized paper (the albumen from fresh eggs, and not sour or mouldy), tone in a hypo bath not weaker than one part of hypo to two parts of water, add the full quantity of chloride of gold, and take out the pictures before they begin to appear slaty. Keep a little chalk in the bath in hot weather to neutralize acidity, and when the solution ceases to tone quickly and deposits a crust on the sides of the bottle, throw it away. Always finish the washing with water nearly or quite boiling.

Ryde.—Consult the advertisements on the back of the Journal: our object is to instruct how collodion should be made, rather than to recommend particular makers.

C. C.—Crapy lines on collodion are often caused by not giving the proper rocking motion to the plate immediately before setting, or by holding the glass in a current of air during the operation of coating. The fault may also be in the collodion itself, from the pyroxyline having been made in strong acids at a low temperature. Try the effect of iodizing with iodide of ammonium only, and omitting the cadmium compound: or of dilutions with ether.

C. B.—See answer to J. R. O.

Annie.—1. To remedy "long black dashes the full length of the plate" in developing collodion positives, keep your slide very clean and pour on a full dose of developer with a sweep, so as to wash off a portion of the free nitrate of silver into the sink. Perhaps the bath is too acid for the collodion: we do not find it safe to employ the full quantity of nitric acid, unless a portion of bromide be added to the collodion. 2. The toning bath is out of order when the prints, on being placed in water to wash, change in colour, and become yellow in the lightest shades. Add a grain of chloride of gold to four ounces of bath in the first instance, and after toning from six to ten pictures of stereoscopic size with this quantity, throw away the solution and make a new one.

J. T.—You may make an artificial sky in the following way:—First print a positive proof from the negative, and cut out the sky with a penknife as near as you can to the edge; this must be afterwards exposed to light until it becomes black; then with a fine camel's-hair brush dipped in gamboge, follow round the outline of the trees and buildings as accurately as possible, and when the paint is dry paste on the blackened paper.

James G. Dear.—If your glass room faces the south-west and you cannot change the position of the sitter, you must keep out the sun by white blinds, and by stippling the glass in places. These blinds, however, become discoloured after a time and reduce the chemical intensity of the light very materially.

W. C. B.—If you wish to print a very large number of copies from your negative in a given time, why not adopt the process by development? You will find it described in the back Numbers of this Journal, and we can promise that the pictures will be quite presentable, although not equal in delicacy to those on albuminized paper. The plan which you suggest would not answer.

Amateur.—1. See reply to "Inquirer." 2. We have succeeded in strengthening a feeble negative, which had been fixed and dried, by the following process:—Dissolve a crystal of iodine and two or three grains of iodide of potassium in an ounce of water. Pour this solution on and off two or three times until the surface of the image is converted into iodide of silver, wash for an instant, expose to the light, and then, in the yellow room, apply pyrogallic acid developer containing a few drops of nitrate of silver. Lastly, wash, dry, and varnish.

P. B. P.—We are much obliged to you for your letter. The sulphate of iron is now fully recognized as a useful occasional substitute for pyrogallic acid; and the intensity of the negative may be increased, either by adding acetate of soda to the solution, or by finishing the development with a mixture of pyrogallic acid and nitrate of silver. You will be interested in hearing that some of our best London operators have used sulphate of iron throughout the whole of the summer.

J. B.—The impression upon our mind with regard to instantaneous pictures is, that very much depends upon the skill of the manipulator. We have seen collodion produce a portrait in two seconds, which another operator had been exposing for six seconds without any good result. Take a sensitive collodion, recently iodized, and dip in a nearly neutral bath made from the best fused nitrate, or the dried nitrate of silver; use fresh solution of pyrogallic acid if you are a beginner, and above all, do not be long in coating, sensitizing, and exposing the plate. If you allow the film to become dry, it will effectually prevent you from taking quick pictures. You are doubtless aware that much depends upon the lens, and that it will be necessary to work with the largest aperture possible. Diffused light in the camera, a common cause of failure in instantaneous photography, must be guarded against by a funnel-shaped prolongation in front of the lens.

Received.—J. T. Goddard; C. Heisch; C. A. Long; T. Grubb.

Mr. Grubb's letter, in which he replies to Mr. Slater, and states his intention of upholding his patent rights, arrived too late for insertion: it shall appear in our next.—Ed.

Letters of inquiry to the Editor can only be answered through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers, Messrs. Taylor and Francis, Red Lion Court, Fleet Street, E.C.

THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 70. SEPTEMBER 21, 1858.

On the day of publication of our last Number, we received a notice that the "Leeds Photographic Society," in conjunction with the Local Committee of the British Association for the Advancement of Science, would form an Exhibition of Photographs, to be held in the Town Hall during the Meeting of the Association. Such Exhibition is to be opened on the 22nd inst., and no doubt under its able management will be well supported. Should any photographer wish at this late period to exhibit any work of his skill, we are told it may still be admitted.

The notification from the Council of the Photographic Society of London, that at their approaching Exhibition "no Photographs will be admitted that have been exposed in shop windows, or otherwise publicly exhibited in this country," has brought remonstrances from various members, and which will be duly considered in Council. We may, however, state that such resolution is certainly not intended to exclude the works of our Photographic brethren exhibited at the Exhibition in Edinburgh, and which opens in December next. It cannot be too widely known that the Council of the Society of Scotland propose to give two Silver Medals as prizes—one for the best photograph exhibited by any artist, the other for the best photograph exhibited by a member of their own Society: the photographs in both cases to be the work of the Exhibitor. This is undoubtedly a step in the right direction, and the proposed honourable distinction will create a stimulus very serviceable to the object of the Exhibition and advancement of the art.

Another visit to the Exhibition at the Crystal Palace has given us much pleasure; we shall again recur to it in a future Number. The number of spectators and admirers show that it is appreciated by the public. We hope that the collection may be more extended.

We have inserted one of several suggestions offered to us for the advancement of the interests of this Journal, suggesting that a portion of its columns should be devoted to the notice of works of merit now so wonderfully produced by the various practisers of the art, in whatever branch they may occur. We shall endeavour, as impartially as we can, to offer our friends at a distance our ideas on such subjects. Books and works of science and art shall not be neglected.

Although it is not an agreeable theme to refer to, we have partially reprinted an able article from the 'Saturday Review,' on the evil tendency of certain vulgar representative and suggestive pictures from life-models. As one means of suppression, we would recommend to those gentlemen who do not wish to see the degradation of Photography, not to allow their own productions to be exhibited in windows side by side of such degrading associations.

We believe, at the art-studios, *as they are called*, where these things are produced, often the most discreditable proceedings take place, and call for the interference of every right-thinking person.

In the dearth of photographic contributions, when all are more occupied with the camera than the pen, we solicited a communication from that enthusiastic follower of science, Mr. Prichard of Leamington, remembering, in days gone by, the pleasant hours we had spent at, and the success which followed our visits to, Kenilworth and its neighbourhood. A letter marked "private" was responded to, and after the use of some persuasion, Mr. Prichard has permitted us to give it in the present Number. We feel that our readers are indebted to him for his plain and most intelligible information. The pictures enclosed are all that one could desire; they possess the half-tints of wet collodion, which are so often wanting in various dry processes, where the development is slow and much silver is used to effect it.

Mr. B. B. Turner, the Treasurer and Honorary Secretary of the Photographic Exchange Club, has issued a very satisfactory address to its members. All expenses are paid, and some few copies of the second volume of the 'Photographic Album' remain in his possession, which may be obtained on the payment of an Honorary Member's Subscription of Ten Guineas. A copy was presented to the Queen, and "Sir C. Phipps has received the commands of Her Majesty to convey to the members of the Photographic Club the assurance of Her Majesty's appreciation of their attention." Mr. Delamotte resumes the Secretaryship. We record this short notice of the Club, now in its third year of activity, and trust that similar clubs or associations may take place in local districts; for, independent of the advancement of art, we believe that such societies will always produce a friendly and kind feeling where they exist.

Amongst the many changes photography has produced in art generally, or the influence it has had upon peculiar branches, there is not, perhaps, a more striking instance to be found than that portion of the Royal Academy Exhibition called the Miniature Room. Time was when a whole side of that room was crowded, every nook and corner often spread out and occupying a large portion of each end: now, however, a few yards of space in the centre of that once crowded side suffice for all that are worth exhibiting.

There can be no doubt the cause of this may be traced to photography; it has swept away very many third- or fourth-class miniature-painters, or turned them into photographic colourists—men who never ought to have adopted art as a profession—men who painted people who flourish in the nineteenth century, but who never flourish themselves.

Nor do we any longer see cases at the private entrances of shops, as formerly we did; nor are we informed, in the present day, that we can "be done for a guinea on the first floor," in the true Miss La Creevy's style. It is curious also to remember how distinctly those cases marked the locality in which they were seen: round about Charing Cross you had middle-aged ladies in turbans and feathers, with a few young gentlemen who had got into regimentals for the first time, a naval officer or two with strongly defined epaulets, and a good sprinkling of clergymen; you never saw a clergyman east of Aldgate Pump in any case; in Cheapside he was seen occasionally; but in that region and east of it, people indulged in blue jackets, and invariably were seen in the companionship of a "spy-glass," sextant, or quadrant.

In Oxford Street, Regent Street, and places thereabouts, the display was much more varied: you saw not only all sorts of people in all sorts of costume, but specimens of artistic ability. Who does not remember Peter Paul Rubens, with his broad black hat and a very pink face? Hebe, too, with her marvellously blue eyes, and her perfect indifference to the lightning flashing about in all directions? and then her hair! why it was curled about her shoulders after the approved fashion of the day. All this has passed away, and photography has to be thanked for it; where you were once "done" abominably for a guinea, you can be admirably taken for half the sum.

But such an inroad has been made in this branch of art, that it becomes a serious question whether we may not lose our miniature-painters entirely. A first-class miniature is, and must ever be, an expensive object, and those who can paint them are leaving the profession. Sir William Ross is too far on in years to make it worth his while to change, Wells, we hope, never will; but Carrick, we are informed, has withdrawn, and adopted the far more lucrative office of colouring photographs. But that most to be regretted is Thorburn having taken to paint large pictures in oil. Now there are plenty of men who can paint life-sized portraits, quite as good as the Duchess of Manchester by him; but we will

venture the opinion that no one living in any part of the world can produce anything equal to these lovely little Raffaelles which have charmed us for so many years; it must therefore be a subject of deep regret that he should abandon that which he can do, and *has* done, so marvellously well.

When Pope wrote that "One only science can one genius fit," he ignored all lessons taught by the records of the dark days of science,—by its present history, as illustrated in the lives of those who now pioneer the great army of science which steadily tramps on in the march of intellect—and by its yet unturned pages, if we adopt the definition of Schlegel, that "history is prophecy with its face turned backwards." For, in fact, it is the true man of science who is, of all others, a very Sir Proteus. "One only science!"—why, the remark involves a crude absurdity; for accurate knowledge of one science must include acquaintance with many more, since there are no ring-fences in the domain of knowledge.

It would be difficult to place the finger on that one only science which fitted the genius of Bacon—to credit that Newton was only a mathematician and nothing more—or to deny a mighty grasp of many subjects to those old alchemists who shunned inglorious ease and lived laborious days to nurture the childhood of chemistry.

Photography, the youngest-born child of science, well illustrates the natural tendency of all intellectual minds to enlarge the field of mental vision, instead of focusing to "one only science," and stopping out all else. Among those who have most earnestly and successfully worked out the scientific problems which give precision to the heliographic art, are men whose names have been long inscribed on some other page of the muster-roll of fame. The astronomer who remembers the grand sentence of Plato, that "light is the shadow of God"; the physiognomist who recollects that quaint work on human faces written by a certain Neapolitan gentleman named Giovanni B. della Porta, who (strange coincidence), three centuries ago, invented the camera; the clergyman who finds in this science elucidations of the natural, and truthful, direct from the author both; the physician——But here we may pause.

"One cannot greatly blame them" (says Lord Bacon, speaking of physicians, in the sixth book of the 'Advancement of Learning') "that they commonly study some other art or science more than their profession; hence we find among them poets, antiquaries, critics, politicians." The medical profession was sadly behind-hand in the days of that myriad-minded man; they have since vindicated the dignity of their high calling; and no better example can be cited to prove the readiness with which every new discovery is made subservient to that noble object—the relief of human suffering—than the early application of photography to the purposes of medical instruction. To one of the Paris hospitals a photographic artist is attached, whose special duty is to preserve representations of cases before and after operation. Stereoscopic illustrations of diseases and of peculiar malformations are taken at most of the principal hospitals for future instruction and guidance. The microscope has been made subservient for the demonstrations of minute pathological changes by means of enlarged photographs, and the typical appearances presented in the different forms of insanity have been unerringly portrayed by means of the camera. All this has been already done, and the day is not far hence when the museum of every medical school will be furnished with photographic illustrations of the terribly diversified forms of disease, and every lecture theatre with anatomical plates that do not depend on the lively imagination of the lithographer, who delineates a scalpel or forceps in the corner of the picture on the same principle as Orbaneja, the painter of Ubela, "who," says Cervantes, "being asked what he was about, answered, Just as it happens: and if he chanced to represent a Cock, he wrote under it, This is a Cock; that it might not be mistaken for a fox."

To the medical profession, and through them to all who have to undergo, at some time, the "ills that flesh is heir to," this use of photography must be of incalculable value. As yet its application has been almost experimental; but the advantages are so evident, and the results so beneficial, when collated and compared with previous observations, that to this application of the photographic art, more than to any other, may peculiarly apply the words of Leibnitz, that "Le présent est plein de l'avenir et chargé du passé."

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and ad-

dress of the writer; not necessarily for publication, but as a guarantee of his good faith. The same proviso extends to communications to the Editor.

PHOTOGRAPHIC CHEMISTRY.

On Bromides in Collodion.

To the Editor of the Photographic Journal.

Middlesex Hospital, Aug. 16th, 1858.

SIR,—Observing in the June Number of the Journal of the Photographic Society some remarks on a paper which I read before the Blackheath Society, which appear to me to indicate a little misapprehension of my meaning, I shall feel obliged if you would permit me to offer a few words of explanation. Mr. Hardwich says that I recommend the use of one part of bromide to three of iodide. This, as a general statement, is not the case; what I advise is, two *equivalents* of iodide to one of bromide: it so happens that one equivalent of bromide of ammonium is just one-third of two equivalents of iodide of ammonium; but the proportion would not hold good with the salts of other bases, and the whole aim of my paper was to point out the advantages I believed to be derived from working in equivalent proportions. With regard to the increased sensibility to green objects given by bromides, I believe one reason that there is any difference of opinion about it is, that most photographers are afraid of it, and use it so sparingly as only to get its effect of preventing solarization, without its increased sensibility to green light.

Mr. Hardwich says that, theoretically, he should not expect this increase of sensibility. What the theoretical grounds are on which he founds this opinion, he does not state; but as it is universally admitted that the bromide of silver is more sensitive to the green of the spectrum than the iodide, it seems to me that *theory* would point to quite an opposite conclusion. Practically, I have no doubt about the fact, both from an experience of many years, as well as from the experiments, the results of which I exhibited to the Blackheath Society. In these last, the time of exposure was in all cases the same, and the collodions were mixed on the same day; in those containing only iodides the green leaves were quite invisible, whilst in all those containing bromides they were more or less perfectly represented, showing (besides the absence of solarization in the white camellias) a positive increase of sensibility to the green.

I must here remark, that great care is necessary in conducting experiments on this subject, not to confound the effect of light reflected from the polished surface of some leaves, more especially in particular positions, with the really green light from those which are not polished, or on which the light does not shine in such a direction as to be reflected straight to the camera. All must have remarked that it is very common to see ivy perfectly represented in the same photograph in which an elm is a mere blotch, though the ivy is the darker green of the two, and would, if protected from the direct light of the sky, be even more difficult to bring out. It is only in-door experiments, where the direction of the light can be more controlled, that really teach us anything on this subject. With regard to the supposed difficulty in obtaining intensity, in warm weather it does not exist, and in cold the addition of a little chloride gives as much as can be wished. Without at all wishing to deny that very much may be done by the judicious use of stops, I think they would be of small use in taking a church with a very white steeple against the sky, and a yew-tree in shade beside it. Even granting the *possibility*, if the use of bromide enable us to work in a shorter time, it is still so much gained. I ought to have said in my paper that the bath must be saturated with bromide, as well as with iodide of silver, and the collodion should be allowed to set well before it is immersed. I cannot conclude without remarking, that Mr. Fenton gives only too true a picture of the proceedings of those who rejoice in calling themselves "Practical Photographers;" but I deny that any man worthy the name of a chemist proceeds in the way described. Not until every one will make up his mind to make no alteration in his chemicals without some definite object, and will take careful notes of the effects of each alteration, shall we get over the reproach, now too truly cast upon us, that photography is all chance and rule of thumb.

CHAS. HEISCH.

[Our theoretical reasons for doubting the efficacy of bromide in copying foliage in the open air were these,—that the photographic effect of the *mere colour* is small as compared with that of the white light thrown off from the leaves. We are still of opinion that the presence of bromide in negative collodion in quantity greater than $\frac{1}{8}$th or $\frac{1}{4}$th of a grain to the ounce, will in most cases lessen the rapidity and intensity of development very materially, and that only experienced operators will be able to use it with advantage.—F. H.]

Further Experiments with Nitrate of Silver.
By Mr. Hardwich.

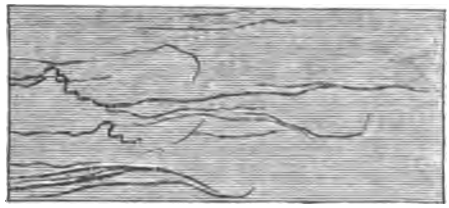
Doubts having been expressed by some as to the correctness of statements made in this Journal on impurities in nitrate of silver, it has been deemed advisable to institute a fresh series of experiments. With this view application was made to the principals of a firm who manufacture nitrate of silver on a large scale. These gentlemen expressed their willingness to forward the inquiry in every possible way, and undertook to supply samples of the acid mother-liquors which furnish the crystals, taking in preference those which were likely to contain the largest amount of impurity, supposing such to be present. It was proposed to evaporate these liquids to dryness, so as to retain the whole of the foreign substances, and then to ascertain the effect produced by them upon the properties of the nitrate of silver.

The contents of two bottles of nitric acid partially saturated with silver, when evaporated on a water-bath, left residues, which were pulverized and dried at 240° Fahrenheit. At the same time a sample of chemically pure nitrate of silver (made by dissolving silver in nitric acid and recrystallizing the product) was treated in the same way. The first point was to ascertain that the preliminary operation of drying had been effectually performed, and that all traces of free nitric acid were expelled. This was done by making a strong aqueous solution and putting in strips of reddened litmus paper. In each case the original blue colour of the litmus paper was slowly restored, and no difference could be detected between the three samples.

Each portion of nitrate was then made into solution for the bath, 30 grains being dissolved in an ounce of water, saturated with iodide, and faintly acidified with a graduated quantity of acetic acid in the usual way. The following were the results obtained:—

No. 1. (Pure nitrate.)—Time of exposure for a stereoscopic view in a moderate light 15 *seconds*. The image developes with a full amount of intensity, and has a tone of red in the sky. Superficial bloom well marked.

No. 2. (Sample thought to contain the largest amount of foreign matter.)—Allowed 15 seconds as before, but with no result. Afterwards gave 1½ minute in the camera, but the image was still under-exposed. On applying the pyrogallic acid, a faint impression came out slowly, without bloom or creaminess, and appearing thin and metallic when held against the light. There was no detail in the shadows; and after fixing with hyposulphite the plate appeared covered with markings, of which the following is a *fac-simile*. The markings are more opake than the surrounding image.



No. 3. (Sample supposed to contain less of impurity than the last.)—Exposed 15 seconds as before: this was too little. With 30 seconds in the camera a tolerable picture was obtained, but the development was less vigorous than with No. 1 (the pure nitrate bath), and the whole image, but particularly the sky, appeared grey and metallic. An indistinct appearance is observable about the lines of the picture, which are blurred, not from defective focusing, but by a deposit of silver taking the direction of the draining in the slide. A chimney, for instance, appears to have smoke issuing from it, although nothing of the kind is visible upon the ground glass of the camera.

In the above figure the blurring is shown of the opake kind, but sometimes the reverse obtains, and translucent objects are encircled by a halo which is lighter than the surrounding image. In another experiment performed in direct sunlight, the above peculiarity of development was not seen, but the exposure was unusually protracted, and the development slow and feeble. Different samples of collodion were next tried. Those succeeded best which in another bath produced red and intense negatives, but all gave pictures inferior to negatives taken in the bath of pure nitrate. One sample of collodion, rather strongly coloured from liberation of iodine, produced a negative of average quality in the pure bath, but *a transmitted positive*, nearly perfect, in the bath No. 3.

Leaving the solutions No. 1 and No. 3, the experiments were next resumed with No. 2, which appeared to be in a useless condition. It was first agitated with kaolin, with a hope

of removing any organic impurities, but no difference could be detected, two minutes in the camera proving still an insufficient exposure. Afterwards it was exposed to sunlight, but no immediate deposit took place. The effect of fusion was then tried. On boiling to dryness and raising the heat, the residue of nitrate did not melt, but blackened and frothed up, evolving gas. It was then redissolved in water in the usual proportion, and again rendered slightly acid. On dipping a collodionised plate, it was found that the fusion had made an evident change. The sensitiveness to obscure radiations remained almost *nil* as before, but the development was now altogether as intense as it had before been feeble. The sky came out first of a fiery-red tone, then rapidly blackened, and on examination after fixing, the image appeared abnormally opake, being entirely black and white, without half-tints. The peculiar markings shown in the first woodcut were still visible, but had altered a little in shape.

With these facts before us, we can scarcely avoid forming the conclusion, that both the residues from the mother-liquors were contaminated with organic matter, but to establish this beyond a doubt one additional experiment was tried. It is well known that if chloride of silver be precipitated from an aqueous solution containing certain kinds of organic matter, it will blacken with unusual rapidity when exposed to sunlight. The bath No. 2 (after fusion of the nitrate) was therefore compared in this manner with No. 1, both being largely diluted with water, and precipitated by a given weight of salt. The difference was remarkable, not only as regards the rapidity with which the chloride discoloured in the sun's rays, but in the tint assumed, which, in the case of the pure nitrate, was a violet-blue, but with the other a reddish purple, quickly passing into an olive-brown. This accords entirely with facts previously well established.

It appears at first somewhat strange that organic matter in the nitrate bath should have the effect of *enfeebling* the image, and the author confesses that he was at first led astray by this circumstance from a preconceived notion that the reverse was invariably the case. We must bear in mind, however, that the impurity now spoken of, although organic in nature, must be a product of the action of nitric acid; and the following experiment shows also that the same organic substance in the bath may at one time increase the intensity of the developed image, and at another diminish it. Two nitrate baths were saturated with glycyrrhizine, excess of acetic acid being added to the one, and excess of acetate of silver to the other. Both, when first examined, produced, even with a feeble sample of collodion, intense negatives, with a tone of red; but on a second examination, after the lapse of some weeks, it was found that the acetate and glycyrrhizine bath remained as before, whereas that containing glycyrrhizine and acetic acid had completely altered, and gave only transmitted positives, metallic and translucent. The peculiar changes in collodion mentioned in a paper published in the Journal for August, are probably an illustration of the same fact. The pyroxyline in this case is slightly decomposed, and the collodion, when first iodized, produces a brown negative, with red solarization in the extreme lights. After many weeks' keeping, however, much iodine is set free, and the image is then metallic, with grey solarization in the sky; this state of film will always produce a transmitted positive, more or less perfect, when the plate is exposed in the camera sufficiently long to bring out the half-tones.

Normal Nitrate Bath.

To the Editor of the Photographic Journal.

Lower Road, Islington, Aug. 27, 1858.

Sir,—In your last Number Mr. Thomas informs us he has hit upon a process for neutralizing an acid bath, and gives what appears very like an enlarged copy of instructions for this purpose which appeared in the Journal of November 1856—the difference being, he recommends nitric acid instead of acetic for combining with the dissolved oxide. This I cannot allow as an improvement, for however nice the manipulation, it is next to an impossibility to saturate the solution without leaving an excess of acid.

By using acetic acid we get acetate of silver and excess of acetic acid. A slight portion of the latter would certainly not be objected to by any photographer; but as regards the former, is its presence in the proportion of less than $\frac{1}{100}$th gr. per ounce detrimental or otherwise? Mr. Thomas says it is subject to change from evaporation and liberation of acetic acid. I don't see what change can be produced in a solution of acetate of silver by evaporation, unless it be evaporated to dryness; and the very fact of its weak basic affinity has caused it to be recommended by some of our highest authorities for preventing the objectionable development of nitric acid, as well as for producing intensity, and there can be no doubt that a minute portion of it is preferable to a trace of nitric acid.

Mr. Thomas proposes making both oxide of

silver and nitric acid of known strength; the oxide, *i. e.* the protoxide, cannot be made of *unknown* strength, and there is no difficulty in obtaining acid of 1·50.

I originally recommended the *moist* oxide, but have since found the *dry* oxide to succeed equally well; the only precaution necessary is to leave it longer in the bath, say three or four hours, and occasionally agitate the vessel containing it.

There is another application of the oxide which I will again introduce to notice. A few grains in either the dry or moist state will decolorize a floating bath, or if added to acid retained in a new solution of nitrate of silver will prevent its becoming coloured.

THOMAS A. BARBER.

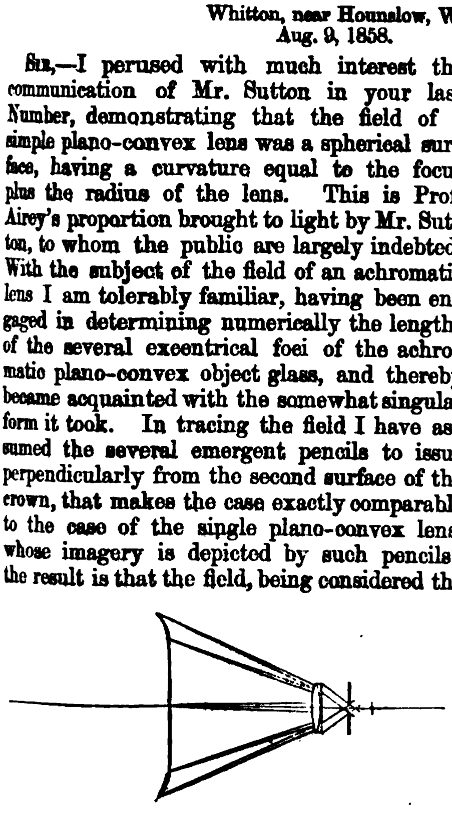
OPTICS.

The Field of an Achromatic Lens.

To the Editor of the Photographic Journal.

Whitton, near Hounslow, W.
Aug. 9, 1858.

SIR,—I perused with much interest the communication of Mr. Sutton in your last Number, demonstrating that the field of a simple plano-convex lens was a spherical surface, having a curvature equal to the focus plus the radius of the lens. This is Prof. Airey's proportion brought to light by Mr. Sutton, to whom the public are largely indebted. With the subject of the field of an achromatic lens I am tolerably familiar, having been engaged in determining numerically the lengths of the several excentrical foci of the achromatic plano-convex object glass, and thereby became acquainted with the somewhat singular form it took. In tracing the field I have assumed the several emergent pencils to issue perpendicularly from the second surface of the crown, that makes the case exactly comparable to the case of the single plano-convex lens, whose imagery is depicted by such pencils; the result is that the field, being considered the



locus of the primary foci for a series of small pencils emerging perpendicularly, is very nearly flat for 20° from the centre of the picture; but after that falls *behind* the focusing screen as the obliquity increases. The figure is a reduction from a large diagram, wherein the computed foci were laid down with accuracy. It may be observed that the field is the locus of the circles of least confusion in the parts of the picture remote from the axis, and not that of the primary foci; this may be so, and strictly we may have to take a series of more excentrical pencils than the one that emerges perpendicularly to delineate our field from; as the field should be considered as the locus of the best defined images, wheresoever situated, each coming from that part of the lens most competent to form a good image; but the case I have taken is a near approximation. I have also found that had a series of more excentrical pencils been taken, the field would have then fallen more rapidly back; and if thickness were allowed, for that increases the calculation considerably, this would also tend to throw back the marginal images, while it has a different effect in other parts of the picture. On the whole, therefore, I think we are quite safe in considering the field of a plano-convex or meniscus (old form) achromatic as flat for the most part of the picture, but receding from the lens for the most oblique incidences.

J. T. GODDARD.

Grubb's Patent Lens.

To the Editor of the Photographic Journal.

Dublin, Aug. 18, 1858.

SIR,—Although the pages of your Journal I apprehend to be neither a suitable nor a convenient place for discussing a matter of patent right, it may, notwithstanding, be desirable that I should say a few words in reference to Mr. Slater's letter, published in your last Number.

Firstly, then, I desire to state, for the information of Mr. Slater and others, that I have before me the unhesitating opinion of a party long and extensively engaged professionally in patent business, to the effect that there is nothing detailed in Mr. Slater's letter to invalidate my patent. Secondly, that armed with the professional advice before me in reference not only to Mr. Slater's letter, but also to the statements of others of similar bearing, it is my intention to uphold my patent, if infringed. Thirdly, that I have devised means by which the patent lens will be placed in the hands of photographers without any extra charge for its peculiar (and increased labour of) construction, as aptly described in Mr. Slater's letter. Fourthly, that I am quite satisfied to leave to the candour

of photographers generally the question of how far they are indebted to me or others for bringing forward this construction of lens? as well as the question of how far the *working up* of one such lens covertly in the construction of a portrait combination (in which by the way it was probably far from effecting an improvement) was more likely to have made the construction known, than if the said lens had been allowed to rest in peace in some private receptacle? and lastly, how far Mr. Slater was likely to have ever published the construction himself for the benefit of photographers? seeing that the objections he saw to its manufacture were quite as much removed ten years since as they are (save by myself) up to the present time. It may not be amiss to add that the lens is patented in France as well as England, &c., and that my claim does not extend beyond photographic lenses, it therefore does not include either telescopes or microscopes.

THOMAS GRUBB.

PROCESSES.

The New Process.

Westrock House, Leamington, Sept. 12, 1858.

I REALLY have little fresh to say about the "New Process." The history of its discovery may, however, amuse you, and I also send you two specimens, which, if you think them worthy of such distinction, you may refer to in your next number.

The process was hit upon in this wise:—My friend Mr. Fothergill and myself were trying experiments with a view to produce something more simple, more *intelligible*, and more satisfactory than the collodion-albumen.

I was working at diluted proportions of sugar and also of honey, in each case making *one sensitizing* the essential point. I had arrived at some fair results when Fothergill visited me to witness the development of several plates differently treated.

One of these was a *washed* albumen plate; it was an outrageous long time in showing life, so much so that I left it in despair. Next day Mr. Fothergill showed me the plate finished, and a splendid negative it was; I believe it took an hour or more to develope.

Well, I was struck with the fact, and felt convinced that a beautiful chemical action had been in operation; I don't know how it happened that I at once hit upon the right degree of washing; but so it was, and I produced plates which worked quicker and more surely than the collodion-albumen. From that time I have *never* failed, as far as the process goes. I can prepare a 12×8 plate, from the moment of collodionizing it to the setting up to dry, in 4 minutes. For my part I prefer the dry process in its effects, abstractedly, to the wet, and the convenience is immense.

I can take out two 12×8 double dark slides and three double stereoscopes all of my own invention, making ten pictures, and carry all myself, my camera being one also after my own design, most simple and light; after all, however, I do not intend to do much more in the photo line—it takes up sadly too much of my time and thought. Great care should be taken not to put the plates into a dark box until they are thoroughly dry. I am disposed to think that an artificial drying on a large hot-water plate would be a great dodge. I know that it answers well, and you may possibly like to try the process; if so, don't trouble yourself with any prosy yarn and complicated descriptions of this *most* simple process, but manipulate as follows, and *I* will answer for the result:—

1. *Bath.*—35 grains of nitrate of silver to 1 oz. of water.
2. *Albumen wash.*—
   Take whites of three eggs;
   Distilled water............ 14 drachms
   Liq. ammoniæ of the Pharmacopœia............ ½ a drachm.
   Froth well and allow the liquid to subside; no need of filtering, pour off as clear as may be, or pass through muslin if you prefer it.
3. Collodionize, say a quarter of a minute. All collodions will not answer, for unless prepared with acids at a high temperature the films will be liable to crack.
4. Sensitize, say 2 minutes; then drain in the hand for a few seconds, place the plate in a dish with water just enough to cover it —say for a 12×8 plate 3 ozs. of filtered rain—gently move the water to flow over the plate till all greasiness has left it, say half a minute.
5. Now pour on some albumen wash, and work it round and round—say half a minute.
6. Then wash well by a stream from a jug equally and thoroughly over the whole plate —say for three-quarters of a minute, making 4 to 5 minutes of manipulation in all.

Dry, expose, and develope.

7. *Developing solution.*—
   Take pyrogallic acid...... 2 grains
   Acetic acid ....10 drops
   Water .... 1 oz.;
   and before using add to each drachm 1 drop to 2 of the silver bath.

The other day, in showing the process to a friend, I took a clean plate in my hand (stereo-

scopic), and from first to last, including exposure (40 seconds), I occupied 20 minutes: so, on the score of simplicity, expedition, and excellence, nothing, I think, is left to be desired.

JOHN PRICHARD.

P.S.—Have photographers experienced much greater intensity of actinism at the seaside than in inland localities? Whilst taking a picture on the coast lately, I found that I could not give a 10 × 8 plate with a Ross's 15-inch focus lens more than a minute-and-a-half or 2 minutes' exposure without solarising. I formerly gave from 2 to 3 minutes with *the wet process* when working in a midland county.

J. P.

*** See an able paper by Dr. Mansell of Guernsey, published in 'Notes and Queries,' entitled "The Calotype on the Sea-shore." —ED.

Taupenot's Process.

To the Editor of the Photographic Journal.

SIR,—From the letters of "Theta" and Major Russel in your Number for July last, I am glad to see that the above subject does not appear to be entirely worn out, and therefore venture to offer you the following remarks, in the humble hope that they may be of use to some at least of your readers who are following out this beautiful process. I commenced experimenting upon it immediately after the publication in your Journal of Dr. Taupenot's memoir, and have long since used it exclusively in practice, finding it vastly superior in my hands to any other wet or dry process in its *certainty* and the beauty of its results. In September, 1856, I ventured to send to your Journal a formula, which gave me good pictures *perfectly free from blisters*; and, although I have since very much modified that formula, I have never been troubled, in practice, with this great source of failure. After long practice and a great many experiments, I believe the principal essentials to success in the Taupenot's process are as follows:—

1. Rigorously clean glasses.
2. A collodion giving a non-contractile film, powdery and porous, but adhering well to the glass.
3. Albumen, to which honey, or some other similar substance, has been added to destroy as much as possible its elastic force when sensitized, and
4. As a precautionary measure, the dilution of the albumen with water.

I believe it to be too general an error amongst amateurs to consider the Taupenot plate as consisting of two distinct films, collodion and albumen. With some collodions, and with albumen prepared as recommended in some published formulæ, this is unfortunately but too likely to be the case. If the collodion be not porous to a great extent, the albumen will not be properly absorbed by it; and if, on the other hand, the albumen be too thick, it will be difficult to make it combine properly with the washed collodion film; and hence arises one kind of blistering in which the albumen separates from the collodion film, and patchy spotted negatives are the result.

The blisters, however, which most frequently beset the operator are of a different kind, consisting of expanded portions of the combined films which rise from the glass under the influence of the nitrate bath. This tendency to expansion appears to be due to the action of the nitrate of silver on the albumen, rather than to the liquid in which the former is dissolved, for a moist albuminized plate will blister as much as, or more than, a dry one. The addition of honey in sufficient quantity effectually counteracts this tendency, and ever since I have employed it I have never found myself annoyed by what "Theta" very properly denominates the "great drawback" to the Taupenot process.

If any of your readers feel inclined to try the appended formula, I feel sure they will meet with success—with regard at least to this great Taupenot bugbear.

The iodizing of the albumen is a point of great importance, and must be regulated by the class of objects to be reproduced. In *pure* landscapes I have obtained great rapidity by the use of bromides only, but have generally found the negatives deficient in half-tone. The proportions given in the formula are what I use for monuments and old mediæval buildings, where there is often much detail in the shadows requiring long exposure, and at the same time bright lights, which must not be solarised, and a sky to boot, which the outlines of the object render it quite impossible to blacken after the negatives are finished. By combining iodides and bromides in different proportions, a great variety of result may be obtained. I have found that iodides alone solarize in the lights and sky long before the details in shade are out. Bromides alone will solarize also, but not to so great a degree, but a mixture of the two in equal proportions will bear a long exposure, and the half-tones will be imperceptible, whilst the blacks are unmanageably opake and useless for printing. The proportions I transcribe give me negatives of the following qualities:—Half-tones, well defined and graduated, skies which require no retouch-

ing, and high lights just so transparent as to leave a shade in the lights of the positive against the sky. I sometimes expose for half an hour, and never less than twelve minutes, using a 14-inch focus lens and ⅜th-inch diaphragm. The blacks of the negative have a deep olive tinge, which varies, however, with the quantity of nitrate of silver added to the gallic acid, which addition may be varied according to the appearance of the negative as it may seem to require. Gallic acid appears to be, *par excellence*, the developer for albuminized plates, it gives a finer and more delicate deposit than the pyrogallic, and by its gentle action as a reducer enables you to modify the development at will; it gives finer half-tones than the pyrogallic, and the blacks are not so opake.

In conclusion, I must not forget to remark, that the operator need not fear any want of intensity from the use of a dilute albumen; even if the proportion of water recommended is doubled or trebled, any amount of depth and vigour will be found attainable.

Formula for the Taupenot Process.

Collodion—

Any kind giving an adherent and porous film; the sensibility being of no consequence.

Albumen—

White of egg	6 parts
Honey, by weight . . .	2 parts
Distilled water	8 parts

Add a little yeast and place in a warm place, and, when fermentation ceases, add to each fluid ounce of the mixture—

Iodide of ammonium . .	5 grains
Bromide of ammonium . .	1½ „

Filter with care through blotting-paper.

Nitrate Bath, for both Collodion and Albumen—

Nitrate of silver . . .	35 grains
Glacial acetic acid . .	35 minims
Distilled water . . .	1 ounce

Saturate with iodide of silver and filter.

Developer—

Distilled water . . . . . *q. s.*

Gallic acid to saturation.

To each ounce add, before placing the solution in the cuvette—

Glacial acetic acid . . .	½ drm.
Solution of nit. silver (60 grs.)	30 drops.

Fixing solution—

Water saturated with hyposulphite of soda.

Manipulation.—Arrange on the table of your dark room four glass dishes, each a little larger than your plates; partly fill the three first with distilled water, and the fourth with the iodized albumen.

Having sensitized your first plate, place it in the first dish, and, whilst the next plate is sensitizing, wash well by keeping the dish in motion, then move it to the second, and so on to the third. On withdrawing the plate from the third cuvette, drain for a minute on clean blotting-paper, and then immerse in the albumen bath. It is essential that this should be well kept in motion for a time. On withdrawing the plate, it is probable some bubbles will adhere to the surface; if this is the case, wash them down into the bath with some of the same albumen, poured from a measuring-glass, and rear up the plate on clean blotting-paper to dry.

If it is intended to preserve these plates long before sensitizing, it is well to dry them on a hot-water bath, or in a drying-box, which may be done without any detriment, notwithstanding the honey; but as the latter substance attracts moisture strongly, the plates, if placed in a grooved box without artificial drying, are apt to contract mildew and spoil. After the second sensitizing, I have not found this to occur.

The second sensitizing is to be conducted with the same bath as the first, the washing being performed with even greater care. The colour of the bath may be altogether disregarded; it does not produce any ill effect. On the other hand, Kaolin is very difficult to filter out, and produces specks on the negatives.

The other operations need no comment. In February this year I exposed, for experiment sake, three plates prepared in October 1856: two were failures, from stains of all kinds; the positive from the third I send you.

EGBERT MOXHAM.

The Glass Calotype.

To the Editor of the Photographic Journal.

Fakenham, Norfolk, 13th Sept. 1858.

SIR,—The number of processes for working with dry collodion plates may now be called legion, and I have no doubt that, in the hands of their inventors, each will give satisfactory results, but very frequently the amateur, after following implicitly the directions given, obtains only partial success, or total failure.

My object in addressing you now is, not to attempt to explain this anomaly, but to describe a mode of manipulation, by which I think it will be found quite impossible for any one to fail in obtaining a good negative with absolute certainty.

I propose to call this process "*The Glass Calotype*," as it is the application of Fox Tal-

bot's process to glass plates instead of paper. I proceed thus:—Coat a glass plate with any good *porous* iodized collodion, such as Ackland's or Bland and Long's; sensitize in the usual 35-grain bath of fused nitrate of silver, containing 1 drop of glacial acetic acid to every 6 ounces, then wash well with filtered rain water, and immerse for a minute in a bath of iodide of potassium, 5 grains to the ounce; again wash *thoroughly*, and coat with plain albumen as Mr. Fothergill proposes, and wash it off again and dry. The plate is now in the state of a sheet of calotype paper, and I sensitize it when wanted for use in the same way, viz.: mix in the following proportions—

1 drachm of distilled water,
5 drops of 30 grs. solution of nit. of silver,
4 drops of saturated solution of gallic acid,
3 drops of glacial acetic acid,

and pour it over the plate, and after about a quarter of a minute pour it off again and dry in a dark place. Expose in the camera about the same time as for Taupenot's process, and develope by either of the following methods.

1st. Place the plate in a paper tray, and pour over it saturated solution of gallic acid, to every ounce of which has just been added 10 drops of 30 grs. of solution of nitrate of silver, and 10 drops of glacial acetic acid (the latter to be increased in very hot weather to 15 or 20 drops).

2nd. The development may be effected in the usual way for wet collodion by pyrogallic acid, 1 gr. or 1¼ gr. to the ounce, with 20 or 30 drops of glacial acetic acid, and 10 drops (30 grs.) of solution of nitrate of silver; but I prefer the former mode, as being the cleaner and more certain, although much slower.

The negative may be fixed in either hypo or cyanide.

If the plates are required to be kept for any length of time after sensitizing, it might be better to omit the 4 drops of solution of gallic acid, as the keeping powers of plates sensitized with it require to be tested.

J. A. Miles.

APPARATUS.

Portable Tourist's Camera.

Sir,—The essential characteristics of a good "Tourist's Camera" are simplicity, lightness, and non-liability to derangement; these desiderata will be found combined in the camera described below. Cloth-body cameras have been in existence in various forms for a long time, but they have usually been of such complicated structure, and so liable to get out of order, that they have met with very limited application, objections to which this present form is not liable.

The camera consists of a frame capable of receiving the ground focusing glass and the dark slide for the prepared plate or paper; to this frame is hinged at its lower part the bottom board of the camera, which also is hinged, so as to fold up more conveniently.

The body of the camera is made of strong black cloth, perfectly impervious to light, and in the form of a truncated pyramid; the large end of it is fastened to the frame that contains the dark slide, and the other is closed by the mahogany board that carries the lens. This board is furnished at its lower end with a pair of lifting hinges, which allow of the front being removed when the camera is to be folded up; a brass rod secured by a screw, extending from the frame at the back to the mahogany front carrying the lens, completes the arrangement.

It will be seen that very little time need be occupied in fitting up and taking down this camera. Also the parts of the arrangement being all connected together, there is no danger of suddenly discovering on a journey that we have lost or mislaid any essential screw or fastening at the moment we wish to use it.

The diagrams represent a camera for pictures 11 in. × 9 in., drawn to the scale of 1 inch to the foot.

Fig. 1, the camera when folded up for travelling. Fig. 2 represents the camera in use.

The weight of this camera and glass frame is only 4½ lbs.

Bland and Long.

Fig. 1.

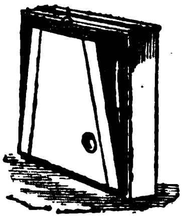
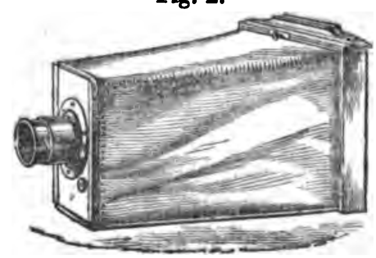


Fig. 2.



REVIEWS.

Photo-Stereographs of the Monster Shell.

Mr. Skaife, of Vanburgh House, Blackheath, has sent us specimens of his success in taking a photo-stereograph of the monster shells fired in Plumstead Marshes on the 28th of July last, and so well described by him in 'The Times' of August 5th. These are productions not only interesting to photographers, but, in the words of Mr. Skaife, they "offer matter for the serious consideration of a profound student in Nature's laws."

The Story of Little Red Riding Hood. A series of Photographs by H. P. Robinson, *of Leamington.*

Mr. Robinson is well known as an artistic photographer, and these four pictures bear witness to both his artistic and photographic skill. They possess that general uniformity of colour, with nice distribution of light and shade in the production of the half-tints, which photographers much appreciate; whilst every artistic mind must admire the careful grouping of the figures, the skill with which accessories are arranged, and the evidences of study and thought displayed in the management of all these details, so essential to the production of a real picture.

The photographs are four in number. There is the little happy face eager for the journey to that unhappy grandmother:—the lithe attentive figure, "in scarlet mantle wrapped," listening at the cottage door for permission to enter:—the child puzzled by the odd looks of that wolf ensconced in bed, *vice* grandmother, eaten:—and lastly, a charming picture of the little one rendering thanks at her mother's knee for her escape.

Mr. Robinson has been particularly happy in his model—an admirable embodiment in both feature, form and expression of the innocent little maiden who lived in that great epoch—the "Once upon a time" when all these marvellous events occurred that we once so devoutly credited. Some others of these will, we trust, receive photographic illustration by the same skilful hand that has thus so beautifully rendered the story of that Una of our nursery days—Little Red Riding Hood.

The Mind Unveiled: a brief History of Twenty-two Imbecile Children. Philadelphia, 1858.

We regret that our literary speciality forbids any lengthened reference to the deeply interesting records contained in this little work which comes to us from across the Atlantic, and tells the story of what has been done in an Institution established near Philadelphia for the reception and education of idiot children. The individual cases are graphically narrated, the gradual improvement under watchful care and judicious training well described, and the appearances of the children illustrated by photographic portraits. It is true that these are scarcely worthy of the literary contents, being deficient in intensity, and wanting in that true arrangement of the subjects as regards light and shade (both physical and mental) so essential where expression is the object of the photographer. But this application of the heliographic art is of such vast importance, and will, in time, become of such great practical value, that we record with pleasure the appearance of this little book as a forerunner of other and more elaborate works in which the art of photography will be employed to illustrate this painfully interesting subject.

It is gratifying to learn from the cases recorded, how great are the advantages which result from the education of idiot children; and that we may hopefully doubt the harsh legal definition of an idiot given by Blackstone as being "one that hath had no understanding from his nativity, and therefore is by law presumed never likely to attain any." For here we read of poor children, who instead of being "little lower than the angels," are little better than the brute, yet who, by careful training, acquire an acuteness and power of rational judgment which stamp their intellectual fellowship with men. There are cases, moreover, recorded in this little work, which point a moral for the wise of the earth. One idiot child is the offspring of an opium-eater, another of drunken parents, and so on. And thus it behoves every one to take heed to his ways, lest vitiated himself, and "mox daturus progeniem vitiosiorem," he learn too late how retributive is that justice which "visits the sins of the fathers upon the children."

MISCELLANEOUS.

To the Editor of the Photographic Journal.

Hammersmith, Sept. 1st, 1858.

Sir,—Having just received No. 69 of the 'Journal of the Photographic Society,' by which I see that the title is slightly altered, viz. from the 'Journal of the Photographic Society, edited by William Crookes, Secretary of the Society,' to that of the 'Journal of the Photographic Society,' I trust, Sir, you will not deem me impertinent if I make bold to suggest to you something which I consider to be yet wanting in the Journal to make it more generally read;

I do not mean to say that the articles contained in it are not of sufficient interest to many of the readers of the Journal; but I do say, as an ardent admirer of the beautiful art of Photography, that many of the articles which appear from time to time are not of sufficient interest for the million photographers who now exist. What I propose is, that the works of photographs be periodically reviewed in the Journal, and lists from time to time be given of photographs worth preserving by those who are making collections; there can be no doubt but there is at this time many who are collecting specimens for future preservation, which will in fifty or a hundred years hence show those living then the state of photographic art in our times. I do not pretend to the gift of prophecy; but I am sanguine that the day is not far off when photographs will be taken in the natural colour of the object presented to the lens; however, be this as it may, time alone will decide. "Never despair," is good and true English. I am of opinion that photographic works as they are issued from the manipulator for publication ought to be reviewed; paintings, engravings, sculpture, and other works of art are done so, their beauties or defects are brought prominently before the public by their several organs. I am not aware that anything of this kind has ever been done in any photographic periodical.

In the leader of the Journal of this month (August 21st) it is stated that the Council have resolved to hold an exhibition early in January next. "*Good.*" They have also passed a resolution not to admit any works that have been exposed in shop-windows, or otherwise publicly exhibited in this country; I doubt much the wisdom of this resolution, I don't know whether it is meant to throw a kind of exclusiveness around their exhibition, or is meant to deter parties from publishing until after the exhibition is over. I trust the last will not be the case, as I believe the photographic art is indebted for some of its first-rate masters to having first seen and afterwards admired and studied the beautiful photographs exhibited in the shop-windows of certain printsellers, opticians, &c. I myself never pass such shops as Murray and Heath's, and Fore's of Piccadilly, Hogarth's of the Haymarket, or Spooner's in the Strand, and many others that I could name, without receiving a great deal of pleasure and instruction in the truly beautiful art. I feel assured that a page of your valuable Journal devoted to a review of photographs, stereographs, &c., recently published, would be very acceptable to many of your readers, and I am certain would greatly increase the number of your subscribers.

While I am writing may I ask a question, one which I fear cannot be very easily explained, viz., how is it that, we being an insular people, the sea being as it were our natural element, there are so few photographs of marine subjects (marine paintings are far from numerous)? On looking over the Catalogues of this and last year's Exhibition of the Photographic Society I find that in 1857 there were but six marine subjects, and at this year's exhibition the small number of five was all that were exhibited. In the Exhibition of the Royal Academy of this year I found the same dearth of marine subjects, how this is to be accounted for I am totally unable to answer; I should have thought that such places as the Isle of Wight, Jersey, &c. would furnish subject-matter enough for three parts as many pictures as would be required for almost any gallery in London, but such does not appear to be the case.

I trust, in conclusion, that you will pardon my addressing you on this matter, the advancement of photography, which I have solely at heart, must be my excuse.

W. M'L.

The forthcoming Exhibition.

To the Editor of the Photographic Journal.

SIR,—The resolution of the Council of the Society to admit no pictures "that have been exposed in shop-windows, or otherwise publicly exhibited in this country," will exclude many valuable works from our next exhibition. It can scarcely be expected that photographers can produce fine pictures and then keep them to themselves for many months that the Society might have the first opportunity of exhibiting them. It might be all very well for amateurs to keep their negatives till it is time to print them for the exhibition; but it is well known that those who produce the best works are often professional men, and they expect to sell their negatives for publication. Is it fair that they should be denied the privilege of exhibiting, that is given to inferior pictures which are not worth publishing? Is it fair to the visitors to the exhibition? Very many will be disappointed to find names absent from the catalogue that they look for first, and whose pictures they have no other opportunity of seeing.

A MEMBER.

Yellow Glass.

To the Editor of the Photographic Journal.

SIR,—I can fully appreciate Mr. Ponting's remarks in the last Number of the Journal on the tendency of yellow glass to lose its proper-

ties of obstructing the actinic rays. Some time ago, on trying a new bottle of collodion, I was surprised to find the plate fog on applying the developer. I immediately took the collodion to the maker and complained of its unsatisfactory nature, but was astonished to see him take a perfectly clear picture with it. On trying another picture in my own room the plate fogged as before, but on adding a couple of thicknesses of yellow calico to my window I developed a very satisfactory negative. The yellow glass in my window had been in use two years, and seems suddenly to have become useless; there appears to be no change in its colour. R. H. P.

Photographic Difficulties.

To the Editor of the Photographic Journal.

SIR,—Your journal has lately been so filled with abstruse calculations for the construction of lenses and other scientific articles, that I am in doubt whether you will condescend to help an amateur in difficulty, but I would urge that a large number of your subscribers are beginners, to whom such information might be as well written in Arabic, and who have some claim on you for practical information to aid them in their progress.

As one of this number, then, I beg your assistance in my difficulties.

I am engaged in business occupations which only permit me an occasional day for my experiments, and I find after a week's disuse my collodion, my nitrate bath, everything, in fact, deranged. The collodion I use is Hardwich's; it works well when first mixed, but after a few days it requires so long an exposure as to be useless for portraiture, and I find that a bath, after being laid by, shows alkaline properties, and marks the first plates, like tears on the face of a dirty boy.

I read in one author that to cure this I ought to expose the solution to the sun's rays for a couple of days, which will blacken the organic matter and separate it, then to filter and take pictures.

I have tried this. No organic matter was deposited, the bath remained perfectly transparent, I nevertheless filtered it, but the result was as before. The bath is neither acid nor alkaline, if test paper is to be relied upon; but after a week's disuse I cannot get a clean picture. If collodion won't keep after iodizing, I must prepare very little at a time; but of the nitrate bath, if sixty or eighty ounces can only be used for a few plates, my new amusement will be a very expensive one. Pray help me out of my difficulty, and inform me—

1. How by any simple process I can test the strength of silver in my bath?

2. Whether the solution deteriorates when kept in gutta percha?

3. How when disordered it is to be reinstated?

4. How long iodized collodion can be kept good?

AMATEUR.

P.S. I have just discovered a little cauliflower of pure metallic silver, formed on the back of the dipper—will this help a solution?

[We believe our correspondent is one of many who meet with like disappointments. No doubt most chemicals used in photography are frequently, when in solution, undergoing a constant change.

1. A bath by use loses but little of its silver, certainly not sufficient to render it unavailable if kept in a warm place uncovered; evaporation takes place, and we have seen baths contain nearly double the quantity of silver in the same given quantity of water as at the time of their formation. In former Numbers, formulæ have been given for testing the actual quantity of silver.

2. A gutta-percha bath is certainly not to be relied on; we had one in use for two-and-a-half years and its action was always satisfactory. Now a solution is deteriorated by remaining in it a few days—the glass dipper becomes covered with a dirty deposit, and the whole interior of the surface is much decomposed. Porcelain baths are now made very cheap and of all dimensions. Some of our most successful operators use glass ones enveloped in gutta percha, and which are very convenient.

3. We have seen a bath which was useless quite restored by being placed in the sun, a deposit of organic matter having taken place similar to small grains of gunpowder. Shake your bath up with a little kaolin, filter, and then treat it as recommended by Mr. Thomas in our last Number.

4. It is impossible to say how long collodion will remain good after being iodized. Our present knowledge of that compound is very imperfect. About four months since we received two bottles from one of our best manufacturers. Half of one of the bottles was used with most beautiful results. Now it is almost valueless, works slow, and unsatisfactory. The second bottle had been left in a perfectly dark place and cool. When recently opened and mixed with iodizing compound it turned rapidly very dark coloured, and is so tender that it can scarcely be manipulated with. Without any change of bath a third bottle from the same

sample, recently made, works most beautifully. This little detail is given to encourage our amateur friends not to be dispirited, and attribute to themselves errors which the uncertainty of their chemicals cause, and which we trust the exertions of those gentlemen occupied in the manufacture of collodion will overcome.]

Holywell-Street Revived.

When Lord Campbell's Act for the more efficient detection and punishment of the sale of indecent books and pictures was under discussion, it was objected by Lord Lyndhurst that private libraries and picture-galleries might fall under its operation. His objections were disregarded, and the bill passed. It is not worth while to discuss how far, either legally or practically, the veteran Chancellor's objection was valid, but it is impossible to walk along the streets of London without being made aware of another objection to the measure, which affords a very curious commentary on its principle. How far the filthy commerce which Lord Campbell proposed to check has been subverted we have no means of knowing; but we do know that exhibitions which do not exactly fall within the scope of his bill, but which are perhaps better calculated to effect the infamous objects which it attempted to discourage, than indecencies of a coarser description, are extremely common, and unless we are much mistaken, have recently increased to an enormous degree. There is hardly a street in London which does not contain shops in which photographs, and especially stereoscopic photographs, are exposed for sale, which are certainly not positively indecent, but which, it is equally clear, are expressly intended for the gratification of that pruriency which Parliament tried to deprive of its coarser stimulants. We cannot, of course, enter into particulars upon such a subject; but if any one of our readers will walk down the Strand, he will see numerous shop-windows—in other particulars of the most respectable character—which are studded with stereoscopic slides, representing women more or less naked, and generally leering at the spectator with a conscious or elaborately unconscious impudence, the ugliness of which is its only redeeming feature. There is a brutal vulgarity and coarseness about some of these pictures which is as surprising as it is disgusting. We have seen publicly exposed, in a shop of decent appearance, a slide representing a woman in bed, with a man in his night-cap and night-shirt seated in a chair nursing a baby, and underneath was written, "My last edition." Mrs. Caudle's 'Curtain Lectures,' and the various endearments to which Mr. Caudle resorts in order to avoid them, with other conjugal scenes of the same kind, are apparently extremely popular.

To call such things indecent is perhaps in some cases unjust; but even when they are not open to that imputation, they show a stupid, coarse brutality of taste and sentiment, which is a natural introduction to indecency of every kind. The more we think of the way in which such things are made, and on the use for which they are designed, the more apparent does their offensiveness become. An ordinary indecent print proves only the nastiness of the artist and the vendor, but an indecent photograph implies the degradation of the person who serves as model on the occasion. We are far from joining in the outcry made against the model-room of the Royal Academy. In art, as in medicine or in law, it often happens that the end absolutely necessitates means which, but for that end, would not be admissible. Decency is a matter rather of sentiment than of fixed rule, and there would be far more indecency in sitting a single time for any one of many dozens of the photographs in the Strand than in adopting the profession of an artist's model. It must also be remembered that a picture is always to some extent idealized. A Grace, a Nymph, or a Venus, is an unreal, conventional being, whom we associate only with picture galleries; but it is the very merit and object of these photographs to reproduce the real actual woman in the very attitude in which she agreed to pander to the vulgar tastes of mankind.—*Saturday Review.*

BOOKS RECEIVED.

A Dictionary of Photography, by Thomas Sutton, B.A.
The Photographic Teacher; or, What to do in Photography and How to do it, by G. Wharton Simpson.

ANSWERS TO CORRESPONDENTS.

Gentlemen desirous of admission into the Photographic Society, are requested to communicate with the Secretary, 1 New Coventry Street, Piccadilly, W.

R. L.—The effect produced by the Photographic Slide arises from the chandeliers being pierced with a small needle, the light shining through gives the appearance of their being lighted up. The colour is laid on from the back, by a slight transparent wash. The objection to such productions is, that the shadows being from the windows of the apartment instead of the brilliant chandelier, the shadows are all wrong.

J. P. Gibson (Hexham).—The picture you have sent is a very satisfactory production. The proposition for Election into the Society must be made at an Ordinary Meeting of the Society. We shall be happy to give you our assistance.

hung in the Royal Academy. A book that every one has read is not reviewed by a literary journal. The walls of the Photographic Society should in like manner convey to the public, photographic *intelligence*; and although cases may arise in which established societies may depart from the letter of their own rules, in order to ensure the spirit of those rules (as when the Academy exhibited Maclise's drawings), the Council think that this ought never to take place unless they are confident that the departure will justify itself to the public. We must again, however, explain, that this salutary rule is not meant to exclude the photographic works exhibited in local societies from the January Exhibition. The London Society regards exhibitions, whether in Edinburgh or elsewhere, in the light of professional *réunions* for purposes of study, trial, and comparison. The works exhibited in these *réunions* are therefore no more excluded from the January gathering in London, than are works exhibited before the Graphic Society from the walls of the Royal Academy.

A gentleman engaged in producing photographic studies for publication writes to complain of some remarks of a contemporary on a work of his, which remarks were transferred to our columns last month. Our correspondent is indignant at the freedom of these remarks: we are not responsible for them, and so we must decline to point out the peculiar features that may be considered to be objectionable in the work. We may be allowed to express our regret, that an artist evidently capable of producing photographic studies, about the value and beauty of which no competent judge will mistake, should not devote his talents to a higher class of works.

The daily papers announce the death of Mr. Fallon Horne of Newgate Street, in the Isle of Thanet, after a long illness. Mr. Horne was an amiable man, and had rendered good service to photography. Under the auspices of Mr. Peter Fry, he was the chief person who aided Mr. Archer to bring his collodion process into general use. He is a man, therefore, to whom every practical photographer is more or less indebted, and deserving a record in a journal devoted to the chronicles of a science which he loved and advanced.

A stereoscopic slide is in the shop-windows which seems to us singularly offensive; it is called the "Skeleton's Carouse:" five or six human skeletons sit at a table, hob and nob, smoke, splutter and frolic, with a ghastly humour that makes the blood curdle. On the day when we first made acquaintance with this abomination, we also read in the newspapers the following report of a police case:—

"At Stratford, James List, aged 35, and William Saville, aged 32, who were described as labourers, were brought before a full bench of magistrates, upon remand for the fourth time, at the Court-house, Ilford Gaol, Essex, on a charge of being implicated in breaking into a vault under the church of St. John, Stratford, and stealing a copper coffin, valued at 10*l*. The prisoner List being sworn, and cautioned by the chairman in the usual form, made the following extraordinary confession:—"I was employed by Saville, and was engaged by him at the church in July 1855. On one Saturday morning I was digging a grave in the churchyard, when Saville said, 'Jemmy, what do you say to have old Dr. Taylor's coffin taken out?' I said, 'Oh, no.' He replied, 'Never mind, let us have it out.' We then went to the Coach and Horses public-house, and when we returned he brought with him a chisel, hammer, and other articles. Saville and I then went down into a vault under the church. We broke open the brickwork of the vault in which Dr. Taylor was buried. The coffin-lid was taken off, and the coffin was tilted over and taken into the adjoining vault. We removed the copper coffin, which was broken up into pieces. The metal was left in the vault. About a week afterwards Saville said, 'Jemmy, come and let us have the other out.' He meant the brother of Dr. Taylor. We then broke up the leaden coffin, and left it until the Monday, when Saville fetched a man with a barrow and some bags to the church, and the metal was taken to a house near the Green Man, in East Street, where it was sold to a ragman. I do not know his name, but I should know the man if I were to see him. I bricked up the vault afterwards, and Saville was drunk under the church. [Saville, at this part of the proceedings, laughed.] I received 10*s*. 6*d*. from Saville for my trouble. Saville made the arrangements respecting the sale of the metal, and I do not know what he received." List was subjected to a long cross-examination, but his testimony was not in any way shaken. The prisoners were again remanded for a week."

We are not acquainted with the name of the artist or publisher of the "Skeleton's Carouse," and if we were, we should certainly not name either; but should he be a reader of the *Times* as well as of the Photographic Journal, he will, perhaps, on following the train of thought suggested by the doings of Saville and List, see why the public after all may possibly not like the humour of his human skeletons.

In illustration of our present Number, by the kindness of our correspondent Mr. Ebbage, we are enabled to lay on the table of the Society, for a short period, a little volume, containing some forty specimens of his success in the practice of the Fothergill process. They are particularly interesting, showing as they do how well the half-tones are preserved by this process, rather than by Taupenot's; the first dozen or so in the book being produced by that mode. There will be found also a print from another correspondent, "An Amateur," and although somewhat damaged by transmission through the

post, speaks for itself. A friend permits us to show a proof about 18 inches long, on plain paper, containing nine portraits, printed from several negatives, the printing having occupied three or four days. It points out how important it is to tone and fix a positive soon after it has been submitted to the action of light—its agreeable effect being gradually deteriorated in proportion to the time which has elapsed in the process of printing. Mr. Sturrock, of Dundee, also enables the members of the Society to judge of the merits of the Honey Albumen process, by contributing some specimens of his own, as also of his friend Mr. William Kirkland.

In our last Number we touched upon the influence photography has had upon miniature-painting, and purposed from time to time to make each branch of art that has been subject to its influence the theme for a short notice; our readers, however, will do well to peruse an admirable paper by Mr. R. Hunt in the 'Art Journal' for September upon this very subject. Photography, considered in relation to its educational and practical value, must ever be a matter of deep interest to all, whether as professors or as amateurs; its relation also as an aid to, or influence upon art, in its various ramifications, is in itself equally deserving our best consideration.

Now it will upon reflection, we think, be admitted, that those who are proficient in the art of photography impress all their pictures with an individuality—a something peculiar to themselves,—an individuality, so to speak, perfectly distinct from choice of subject, or apart from manipulation, and hence it is, without the aid of a catalogue in our hands, the authors of the best pictures can be named in each exhibition with as much certainty as we can select them in the Royal Academy, or in any other yearly collection; thus then we have the mysterious impress of the individual mind upon each production. In proof of this, let an artist translate a photograph into oil or water colours, and he fails, simply because he cannot convey the mind of *another* through *his* pencil, and, as a consequence, his picture lacks the first and most essential requisite.

"No picture was ever painted," says Mr. Hunt, "no matter how great the mechanical dexterity may have been by which it was produced, which could live as a work of art unless it bore the impress of thought. It is a marvellous power, but it is ever manifest; the mind makes itself felt through the works of the hand."

An artist looking at a photographic picture may learn some of the mysteries of light and shadow, which cannot be arrived at by any other study; and photography, so used, is of immense advantage to art. The vast influence it has had upon all the schools of painting, both at home and on the Continent, is a subject for much congratulation. We are no longer satisfied with the slight, sloppy painting of ten or fifteen years ago, inasmuch as the eye has become accustomed to the detail and the individualities of the sun-picture. Until of late, a tree was any tree; but now-a-days a tree must be unmistakeably an oak, an ash, an elm, or of whatever kind it pretends to be; for these same sun-pictures have taught thousands to study the minute elements of a great whole, who never gave the subject a passing thought before.

It is admitted upon all hands, that since the introduction of photography, painting has become more solid, more truthful, and more earnest; indeed it is ever the case—the more earnest we are in a right direction, the more truthful we become. Unfortunately many artists are content to paint entirely from photographs: nothing can be more fatal to real progress. This, Mr. Hunt says, "is the mischief photography is doing to art." The great and serious mischief is, to their own reputation. It never can really be mischievous to art; for no one who is thoroughly an artist would ever have recourse to such means, and be independent of all other study.

Sir William Newton had this fear in his mind long ago, for he wisely says in the first Number of this Journal—"I consider it to be a sort of duty as an artist, to recommend to the student in art *not* to take up the camera obscura as a means of advancement in his profession until he has made himself well acquainted with the true principles of his art, as well as acquired considerable power of hand. If, however, the student should imagine the camera will help him in this desirable attainment, without the requisite study on his part, he will find himself much mistaken, when perhaps it may be too late to repair the injury. I am the more desirous of directing the student in art to the foregoing observation, because I am well aware of the seductive nature of the practice of photography, and how it is calculated to divert him from his principal object in the earlier part of his studies."

Mr. Hunt further remarks—"There is a winning charm about photography which may well seduce the artist from his true path. The photograph of even the rotten stump of an ancient tree—so true—moss—fungus—ligneous structure, bark and all, are represented with so much fidelity, and all effected by light and

shadow only—the more we examine it, the more we are delighted with the result." We perfectly understand the desire of the young artist to imitate so perfect a production; and in this desire is the danger which should be avoided.

To a student in art these are unmistakeable warnings. The painting everything in a photograph, even using the lens to discover minutiæ, before enlarging upon canvas, is often painfully evident in what are termed Pre-Raphaelite pictures. In such pictures, the parts, even the veriest and furthest corners, are wrought up with original force to that which should be the point of sight. Breath and atmosphere are entirely lost sight of; and they ever accompany a good photograph. Photography must not be blamed for the errors of a few ill-judging men. One art trenching upon another will always lead in some points to dissatisfaction. Who has ever been content with a mosaic landscape, however beautifully executed, when mosaic pretends to be a landscape, and to imitate oil-painting? It is out of its own element; and though we may admire its effect, and patient labour, we cannot but lament the result is not commensurate with the one, or the beauty equal to the other.

The good old town of Leeds has suddenly awaked to find itself famous. Not content with the presence of Royalty to inaugurate its noble town-hall, it has called in the aid of philosophy and science to add weight to the ceremony. The late meeting of the British Association has been eminently successful; and amongst other adjuncts to its success may be reckoned the Exhibition of Photographs collected together by the Leeds Society, and which Professor Owen particularly eulogized in his concluding address. The Exhibition was divided into three parts, the largest division containing views of scenery in Yorkshire and the principal of its monastic ruins, which gave visitors an excellent notion of the various objects of interest to be found in the county. The views of Rievaulx, Whitby, Fountains, and Jervaux Abbeys, by Mr. T. W. Stansfeld, may be mentioned as capital specimens of a class of subjects of which photographers are very fond, and which are particularly suited for representation by the camera. Kirkstall Abbey is a favourite resort of the Leeds fraternity, and has been "taken" from all points and at all angles, both inside and out; and every stone, stick, and leaf about the venerable ruin has been immortalized at one time or another. Mr. W. S. Ward has a great many views of it, which, however, do not always give one a pleasant remembrance, on account of the wiry hardness seemingly inseparable from the collodio-albumen process. The most satisfactory example of this process is a small view of Lannercost Priory by Mr. W. Salkeld, which has the foliage and detail in shadow nicely worked out. Child and Wormald have some good views of the new town-hall, copies of which were graciously accepted by Her Majesty. Another room was occupied by a series of forty views from Lucknow, by Robertson and Beato, which, of course, are most interesting just at present; but they cannot be held up as specimens of excellence,—the printing, in particular, being wretched. Still they give an idea of the vastness and magnificence of the city, with which even a reader of "the *Times* correspondent's glowing letters" could not otherwise be impressed. The third room contained a miscellaneous collection,—copies of engravings, foreign views, &c. Mr. H. P. Robinson's exquisitely beautiful compositions claimed most attention: his "Fading away" would of itself suffice to raise Photography to a rank among the fine arts,—a rank in which a certain class of artists and ill-tempered "art-critics" dispute its right to be placed. The sentiment in this picture is painful; but the truth with which the lesson of the uncertainty of this mortal existence is conveyed to the mind is startling—a sentiment which the painter too seldom realized: here the absence of colour is a relief rather than a disadvantage. The dying girl's face seems like sculptured marble; the expression of a feeble vitality is perfect. The honour of success must here certainly be divided between the artist and his model. Mr. Robinson's other pictures, "The Passions," are not quite so successful; his "Portrait of the Model" is the best. The copies of rare engravings by Mr. W. Best are certainly equal to anything that has been produced in this popular branch of the art, and lose nothing whatever by comparison with the celebrated copy of "The Itinerant Musicians" by Bisson Frères. A copy of Teniers's "Chymist" is particularly meritorious.

A most beautiful copy of Raphael's fresco, "The Last Supper," by Alinari Frères, attracted much attention. Among the numerous pictures by Mr. Lyndon Smith may be particularly mentioned "Morning Light," in which the transient effect of the sunlight dissipating the early mist is caught perfectly, and, in spite of its general character, seems substantially present to our eye: even the gradations of this atmospheric veil are faithfully rendered. There are also four Lake views by the same artist, which are equally remarkable for delicate atmospheric effect. While the foreground is sufficiently distinct, there is no hardness about the lines;

the distance, too, is actual, and the whole effect most artistic. These are examples of what a photograph ought to be.

Some portraits of native Madagascar worthies are more interesting than beautiful; they are by the Rev. W. Ellis. Three portraits by R. F. Barnes are remarkable for delicacy and soft half-tint. Many other pictures merit mention; and we had almost forgot the magnificent panorama of the Forum, Rome, 80 inches by 23, being three pictures so neatly joined that the division is almost imperceptible.

In conclusion, it must be said that the Exhibition has been a most satisfactory one, and it is to be hoped will be only the first of a series under the management of the Leeds Photographic Society.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

NORTH LONDON PHOTOGRAPHIC ASSOCIATION.

At the ordinary Monthly Meeting, held at Myddelton Hall, Islington, 29th September, 1858, George Shadbolt, Esq., Vice-President, in the Chair, the Minutes of the previous Meeting having been confirmed, the Chairman stated that the presentation photograph was ready for distribution to Members.

The following gentlemen were duly elected Members:—Messrs. Henry Simpson, — Harding, F. Smith, T. Fenn, — Brodrick, A. Witherby, and D. J. Stuart.

Stereoscopic cameras and stands were exhibited by Messrs. Bingham and Shave, and some glass positive pictures by Mr. Lander.

On Mr. Hislop taking the Chair, the Vice-President read a paper "On Focusing in the Camera," and exhibited and explained the uses of Ramsden's focusing apparatus, upon which a discussion ensued. The Vice-President then read a paper by Thomas Gulliver, of Swansea, "On working Wet Collodion in the Field," when a discussion on the subject of development by iron took place.

A vote of thanks was accorded to the Vice-President.

Notice being given that promises of papers for future meetings would be gladly received, Mr. Barber consented to read a paper "On the Causes of Failure by the Oxymel Process" at the next Meeting, on 27th October.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

October 18, 1858.

An ordinary Meeting of the above Society (the first of the present session) took place at the Golf Club House, Blackheath, the President, J. Glaisher, Esq., F.R.S., in the Chair, and was numerously attended.

A report by Mr. Terrel, Secretary of a Committee appointed by the Society to promote the publication of certain Views at Blackheath and its vicinity, was presented, received, and adopted.

The President proceeded to read a paper by Herr Paul Pretsch, "On two main points in Photography" (see below); at the conclusion of which, a vote of thanks having been tendered to Herr Pretsch, the Meeting separated.

OPTICS.

Two main points in Photography.
By Herr Paul Pretsch.

1. *The Camera Obscura—a scientific instrument.*

There is hardly any optical instrument in existence, not even excepting the telescope, which is at present in greater demand and use than the camera obscura. A great many people are occupied with the marvellous and fascinating art of photography; hence arises the desire for better capabilities and more perfect results, because they have too often observed that there are more bad lenses in use than good ones. In the usual way of business, the increased demand would have caused a successive improvement of the article produced; but this has not been the case with the lenses for the camera obscura, because most of them are executed by people who consider the application of scientific principles almost superfluous, and because the notions about the capabilities of a good lens are not sufficiently explained. The points in question are—

1. What is a camera obscura (lens)?
2. For what purpose is it used?
3. What are the capabilities for obtaining this purpose?

4. In what degree, and by what means, can they be united in such an instrument?

A camera obscura is an apparatus for producing at a definite distance a picture of a far or near object.

The desiderata concerning the qualities of the results are numerous: the picture ought to be sharp, strong in light, faithful, even; the lens ought to reproduce far and near objects, if possible, in the same time; it ought to possess a large field of view; the picture ought to be small or large, as it is wished for; and the instrument ought to be very cheap, and handy too.

Many of these demands can be satisfied in a very simple way, by shutting out light from a room, making it perfectly dark excepting only the admission of light through a very small hole in the window-shutter, and placing a screen opposite the hole. There is absolute faithfulness, reproduction of far and near objects at the same time, large field of view (near 180°), flatness or curvature according to demand, cheapness, and ease; but there is the want of sharpness and strength in light. And this deficiency is quite sufficient to make this contrivance perfectly useless for any practical purpose.

We will discuss here, a little, the study of the camera obscura in its simplest form—the small hole in a window-shutter; and we will suppose that the object to be reproduced be at a great distance, therefore that each point sends off to the small hole a very acute-angled pencil of rays, which might be considered as a thin cylinder of rays. If the continuation of the light should be rectilinear, then each pencil of rays, with its proper colour and intensity of light, would go through the hole to the screen, and all the pencils of rays together would form the reversed picture, as in a real camera obscura. Supposing still the rectilinear continuation of light, we could increase the sharpness of the picture by diminishing the hole.

But this is not the case. Suppose we wish to obtain the image of a single luminous point, as a star, and we decrease the hole gradually, the result will be that we obtain by degrees a smaller and sharper image; but if we decrease the opening too much, then the image will become larger again and weaker in light, and at all events the image will surpass in size the opening or hole itself.

This effect of the pencils of rays forms what we call aberration, corresponding to the theory of the bending of light.

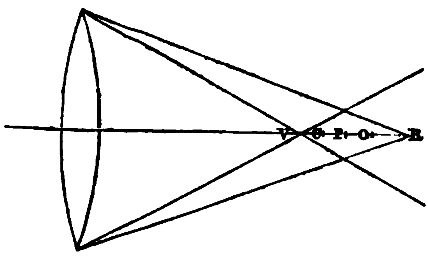
The knowledge of it is necessary to everybody who uses any optical instrument, be it a telescope, microscope, or camera obscura. But it is not sufficient to know that this effect does really exist—we ought to understand its form and quantity, being otherwise without any practical use.

The image of a luminous point is never a point, the hole or opening being as small as possible, but it is a *spectrum of bending*, consisting in a round spot, surrounded by dark and bright concentric circles.

If we diminish the hole in the above-mentioned example to $\frac{1}{80}$th of an inch, we might obtain, under favourable circumstances, the image of a bright round spot of about $\frac{1}{24}$th of an inch diameter, which, looked at at a distance of 12 feet, will appear as a luminous point. As a matter of course, such an image will not possess any sharpness or intensity of light. But the picture of an ordinary portrait lens, only tolerably well executed, with 3-inch aperture and 11-inch focus, will allow the examination with a magnifying power of at least 10 times; it surpasses therefore in this respect the natural camera obscura about 180 times. Better instruments still will show more difference. The intensity of light of the natural camera, in comparison with the above-mentioned portrait-lens, proves an immense increase, because the same is equal to the quadrate of aperture; therefore the difference is 1 : 32,400. In this mode, art and science have improved the deficiencies of the natural camera obscura. And at the same time we perceive that too much diminution of the aperture is not only of no use, but injurious to the picture. For instance, if we stop down the above-mentioned portrait-lens with 3 inches aperture to $\frac{1}{2}$ an inch, we obtain from a luminous point only the image of a round spot, but not the picture of a luminous point, and we cause a kind of aberration injurious to the picture. There are, in fine drawings and writings, sometimes lines of $\frac{1}{800}$th of an inch in breadth; and by copying these lines by a lens stopped down in the above-mentioned mode, they will be covered partly by the circles of aberration of the adjoining points or lines, and will appear smaller and finer; and this effect will be increased by the other difficulty, arising from the curvature of the image, till these lines appear at last like blighted shadows, or not at all perceivable. Such a picture can be looked at by the naked eye, but will certainly not allow the examination of a magnifying power.

Returning to our natural camera obscura without glass, we will try to improve it by inserting in its hole a single (therefore unachromatic) glass lens of 11-inch focus, of crown-glass. As long as the aperture of the lens is kept small enough in proportion to its focus,

the pencils of rays of the same refractibility will be united in one and the same point; we therefore obtain from a luminous point the proper picture of it, if we place the screen in the right place. We therefore immediately perceive that, by this improvement, we experience at the same time a certain inconvenience. With the natural camera obscura without glass, we can place the screen where we like, and we obtain, in proportion to the aperture of the hole, a good picture; but as soon as we apply a lens, we are obliged to place the screen at a certain distance, in a certain point known by the name of "*focus*." And the glass possessing the peculiarity of refracting the differently coloured rays in a different mode, forms separate foci for the yellow and for the extreme violet rays of the spectrum.



The violet rays will be united in V, the red ones in R. Between these two points are situated the foci of all the other rays of the spectrum. Round about O is the focus of the visual rays, which varies according to the perceptibility of the operator, not being the same for every observer. Generally the picture is focused into this place, by every person into another point. Further, in C there is another point nearer to V than to R, there in C are united the chemical rays. Even this point seems to be not absolutely defined, and seems to depend upon the quality of the material on which the impression of light acts. Here ought to be obtained the best photographic picture. A further careful investigation gives the result, that the diameter of the circle of the smallest chromatic aberration depends only upon the aperture of the lens, and not upon the focal length,—a theory important for telescopes as well as for camera obscuras. Besides this chromatic aberration, there ought to be taken into consideration the aberration, mentioned before, caused by the bending of light. The aperture, which might be able to render the sharpest picture in this instance, will be about $\frac{3}{24}$ths of an inch, and is therefore seven times larger than in the natural camera obscura without glass, by which means the intensity of light will be increased fifty times, which is still only a small part (namely $\frac{1}{848}$th) of the intensity of light rendered by an ordinary portrait-lens. The sharpness of the picture of this single lens of crown glass in comparison with the ordinary portrait-lens will be in the proportion of 1 : 15.

This improvement in sharpness of picture and intensity of light is obtained by making sacrifices of some other kind. Faithfulness is not lost, but the ability of obtaining smaller or larger pictures at various distances is injured; then the best picture is only in the focus, being one for the chemical, and another one for the visual rays.

The chemical focus appears like a bad spirit who is shifting away the visible picture. What is then an apparatus with a chemical focus? Certainly such a one which possesses in its axis a point where we can obtain a good photographic picture. And what is an objective without chemical focus? Certainly such a one which has nowhere a point rendering a good photograph. Therefore this technical term expresses almost the contrary of what we intend to say. The difference of the two foci in the above-mentioned instance of an unachromatic lens is about $\frac{3}{12}$ths of an inch.

However, the separation of these two foci is not constant, but varies considerably, according to the distances of the objects to be taken. It is therefore an important obstacle in the use of unachromatic lenses for camera obscuras.

In the natural camera obscura it is indifferent whether the objects represented are near or far off. In using a lens, the objects at far distances are not reproduced on the same surface as the objects near to the lens. This compels the photographer to use various artificial arrangements in the position of the camera, in placing the objects to be taken, and in the construction of his camera.

The picture obtained by the improvement is not flat, but is reproduced in a curvature. Taking photographs in curves produces various difficulties, and we lose again a part of the sharpness in proportion to the size of the field of view. If we increase the sharpness, we are obliged to decrease again the field of view; in fact, it is a proof of the well-known principle, "nothing for nothing." But at the same time we observe the importance of establishing the achromatism, and doing away with the chromatic aberration, in consequence of which we can increase aperture and intensity of light; and an increased aperture originates again a comparative diminution of the aberration caused by the bending of the light.

The achromatism is achieved by constructing one constituent part of the lens of crown- and the other of flint-glass, and is especially well

known in telescopes. Their object-glasses are achromatic, and by the combination of two lenses of different glass we obtain, besides the achromatism, another purpose, namely the removal of a new aberration, the spherical, which becomes perceivable by the use of larger apertures. It originates from the globular form of the lens, which form is the most convenient for the practical manufacturer, but certainly not the most suitable form for concentrating all the rays in one point. The curvatures of the two constituent lenses are therefore such that the spherical aberration appears not quite removed, but reduced to a very small amount. This is achieved generally by a simple equation, considering only one point of the picture, namely sharpness of picture in the point, and its nearest vicinity in the axis of the system. The exterior resemblance of the form is generally considered by the manufacturing optician as sufficient for the production of a good object-glass. The crown-glass lens double-convex, the flint-glass lens plano-concave, cemented together, form, by proper curvature of the cemented surfaces, a whole, which renders the required service tolerably well, if the convex surface of the plano-convex achromatic lens, obtained in this mode, is turned to the object, the plane surface to the picture or eyepiece; only in constructing large astronomical telescopes, more care and attention are necessary.

The same object-glass for telescopes was used originally by Daguerre, and it has been a long time in general use. The use of it as a lens for the camera obscura has proved a considerable improvement of the latter, leading to a practical result of an important invention, and it deserves therefore a little more explanation of its qualities and capabilities.

We can suppose that it has been tried originally to apply this lens to the camera, just in the same mode as it has been actually used in telescopes, that is to say, the convexity to the object, the plane turned to the picture. But most probably it has been found that this application is not practical; the cause of it is a very curious one; in fact, it could not be applied in this mode for the sake of its partial perfectness. The object of it being the reproduction of a very sharp picture, allowing a considerable enlarging, but only small, as we can easily look over with an eyepiece about two degrees, and sometimes less, it really did fulfil it. But the spherical aberration being only removed from the centre, appeared and increased more and more as we deviated from the centre. At the same time the picture is reproduced in a curvature not at all fit for the camera. Therefore there are only two modes of improving the object-glass of a telescope, and making it suitable to the purposes of the camera. The first is to remove the partial perfectness of the instrument, that is to say, to diminish the excellent sharpness in the centre, and also the strong curvature of the picture, till the contrast between the centre and the edges becomes less visible and less disturbing; the second is the removal of the spherical aberration on the edges of the picture by the means offered by theory. The first mode has been pursued by optical praxis, the second can be executed only by science.

Anybody who possesses a theodolite or levelling telescope can make a trial proving the above-mentioned statement. If he reverse the object-glass of his telescope in a way that the plane surface is turned to the object, the convexity to the picture, he will soon find out that he has made of his good telescope a bad one, which can be improved again by considerable stoppage. It is caused by an important quantity of spherical aberration, the pencils of rays never uniting in one point, but reproducing the picture not on a certain surface, but in a kind of space near the focus, forming a layer of several surfaces.

With a lens of 3-inch aperture and 16-inch focus, like those used in the first time of Daguerreotyping, the diaphragm ought to be applied at a distance of about 3 inches from the lens to the object, and allow an aperture of 1 inch; it represents a tolerably good picture, but not equal in quality, allowing in the centre the enlarging of three times, but on the edges it can only be examined by the naked eye.

The transition from the unachromatic to the achromatic objective forms, at all events, an important step in improving this optical instrument. A lens of similar description has been used by Daguerre. But it is not the only one serving this purpose. Achromatic lenses, constructed convex-concave, if they are treated in the same way, offer indeed the advantage that we can bring the diaphragm nearer to the lens, by which means a smaller aperture for the same sharpness and the same field of view is necessary.

In fact, the practical optician in constructing an object-glass for a telescope has to execute only three conditions: viz. 1st, a certain focus; 2nd, the attainment of achromatism; 3rd, the reduction of spherical aberration to its minimum. The first condition does not want any particular care, because it does not matter whether the focus is a little longer or shorter. The achromatism depends especially upon the foci of the constituent lenses, and the spherical aberration relies on the curvatures. This permits that we can deal with the chromatism without meddling with the spherical aberration, and *vice*

versâ. We can cure any of these evils separately. All these circumstances facilitate the execution of a telescope by a practical optician; but it is different with the lens or objective for a camera obscura;—such a lens ought to produce what is called in mathematics "*a picture of the fifth order*." There is not one term, but there are five terms of the spherical aberration to be removed. Therefore three curvatures of lenses are not sufficient, but we want eight different elements—that is to say, eight surfaces of lenses and distances—in order to satisfy these eight conditions. Experiments are here of no use, and theory is obliged to supply the true curves.

[To be concluded in our next.]

PHOTOGRAPHIC CHEMISTRY.

Observations in reference to the state of the Nitrate of Silver Bath, and its action upon Collodionized Plates.

To the Editor of the Photographic Journal.

10 Pall Mall.

The Alkaline Normal Bath, when filtered from excess of oxide.—The plate when developed gives a brownish-red film, streaky, dirty, and greasy in appearance; the image shows through this film in parts very faintly, *i. e.* it is only just discernible; the developer flows over the plate very easily.

The bath with an insufficient quantity of Nitric Acid as a corrective.—The plate when developed gives at first indications of a perfect picture, but with a suspicion of full exposure; the proper and gradual growth of intensity does not, however, take place; the half-tints in deepest shadow are rendered, and show simultaneously with the high lights; a flat, poor, and feeble image is the result; if the subject be landscape, the sky is faint, transparent, and streaky; the exposure in camera may have been very short, and under this condition of the bath, perhaps half the legitimate exposure gives the result described.

The bath with a proper quantity of Nitric Acid as a corrective.—The image springs out shortly after the developer is poured on; first, of a brightish-red colour, the highest lights being from the first well defined; the growth of middle tints next becomes discernible, the parts in deepest shadow show next in rotation, the whole picture being evident before increase of intensity takes place; this now goes on gradually until an unmistakeable harmony pervades the whole; the brillancy of the picture is well preserved, and no sign of fogging exists. If the exposure has been well timed, there is not much fear of over-development. The intensity of sky is good, and uniformly opaque: when viewed by reflected light, the negative whilst wet presents a rich and brilliant positive appearance; when dry, this image is more difficult to see, but should not have any cloud over it, the rich creamy and blue colour giving place to a surface of almost silvery radiance.

The bath with an excess of Nitric Acid.—The image appears in parts of the plate only, and that with great difficulty; the black deposit is very transparent; it is altogether most evident that the deoxidizer (pyrogallic acid) acts inefficiently, the decomposition of the nitrate of silver being checked by the presence of nitric acid in excess; under these circumstances no amount of exposure in the camera compensates for acidity of the bath; the developer flows with difficulty over the plate.

The bath, under some circumstances, requires the addition of an acid.—The indications are, of course, those stated in the second paragraph. In hot weather it is very desirable to add a drop of the dilute acid to every half-gallon of the bath; I find also that when testing and experimenting with collodion *just iodized*, after immersing a dozen plates, a slight alkalinity is evident to an extent not absolutely injurious, but nevertheless is discernible by a falling off in brilliancy of the negative; add a drop of the dilute nitric acid, and all again goes well. No alkalinity is discernible when collodion a day old is employed.

Note.—I find it convenient to use a dilute nitric acid in performing the above operations: when drops are spoken of in these observations, this dilute acid is meant.

In my former paper I made reference to nitric acid for correcting, sp. gr. 1·50. Acid of this strength is frequently met with in commerce; my object, therefore, in taking this acid as a standard of strength was sufficiently obvious: first, to show the exceedingly minute quantity necessary to produce the desired effect; and secondly, for the convenience to be derived from making reference to nitric acid of usual strength. It might, however, appear to many, not desirous of taking the trouble to calculate fractions of a drop, that the correction required for 10 or 20 ozs. of the bath must be attended with some trouble. In order to meet this difficulty, I subjoin the following formula:—

ALKALI (oxide of silver in a moist state), ACID (dilute nitric acid containing about 1 per cent. of real acid). Treat the bath, as described in former paper, with the oxide of silver; filter from the excess, and add to each 20 ozs. of this filtered bath 5 minims of the dilute nitric acid.

It may not be out of place to conclude with

a few general remarks worthy of consideration when absolutely perfect negatives are desired.

The sliding body of the camera should undoubtedly be lined with black cotton or silk velvet. I prefer the latter, the black dye of silk being more permanent: to the eye of a close observer, the fog produced by diffused light from the surfaces of the usual black stain used for the inside of cameras is very evident. Single lenses, under very many circumstances, should be protected as much as possible from reflected light entering the tube of brass-work, by means of a shade over the upper portion of the tube: this helps to prevent solarization of the sky. The shade need not project beyond 4 inches; a piece of brown paper and string answers the purpose. To prove the necessity for this precaution, focus a landscape, withdraw the ground glass, throw the velvet over your head, and look into the camera. A considerable quantity of light will be perceived on the lower surface of the lens-tube; place a shade over the upper portion of this tube, and the extraneous light will vanish. All rays of light that do not actually emanate from the object to be copied, ought to be dispensed with when brilliancy of image is aimed at.

It cannot be too frequently urged that the velvet cloth must be thrown over the slide when in position, before pulling up the shutter; and also that this should be large enough to extend somewhat over the rigid portion of the camera, in order to prevent light entering the sliding body.

I would remark, in conclusion, that experiments with ordinary double lenses of short focal length and full aperture are comparatively worthless for testing the actual value of photographic preparations or processes; the results obtained on small plates are also not sufficiently conclusive. In order to arrive at a full and satisfactory conclusion, when working either for the purpose of chemical investigation in photography, or with a view to establishing the value of any process, plates not less than 12 × 10 ins. should be used, and a single lens of 20 inches focal length, with not more than half an inch aperture. I have for some time past adopted this course, and have found the indications in every respect more valuable and instructive.

I see in the last Number of your Journal a letter signed "Thomas A. Barber." The writer does me the favour to mention my name three times. I should be much wanting in courtesy were I to omit noticing this distinction; but allow me to state that I have never seen the article referred to in that letter. I do not think there is any necessity for altering either my statements or opinions in reference to this subject.

Richard W. Thomas.

Alcoholic Collodion.

To the Editor of the Photographic Journal.

Sir,—It is now upwards of four months since I sent an article to the then Editor of the Journal, detailing the advantages, from practical experience extending over many months, and which had been verified by some of our first-rate professional artists, of collodion made with pyroxyline at a low temperature, and without excess of sulphuric acid, and containing an extra large amount of alcohol, over collodion made with pyroxyline at a moderately high temperature, with excess of sulphuric acid, and with the ordinary proportions of ether and alcohol. I find that, owing to the delay of publication, or possibly the consignment to the waste-basket of so novel an idea, another gentleman has, without having heard of my experiments, brought forward and published a similar idea, and claims exactly the same advantages which I also stated, thus doing me out of priority of publication. The advantages which I claimed were the following:—

1st. The collodion runs in a smooth glassy film, sticks tight to the glass, and allows plenty of time in the hottest weather before putting in the bath.

2ndly. The collodion gives very great intensity, and at the same time keeps a much longer time, from the low temperature of the pyroxyline, than collodions made the contrary way.

3rdly. It iodizes very rapidly in the bath, two minutes being sufficient instead of ten, and becomes perfectly wetted from the mixing of the alcohol and water.

4thly. The bath keeps a much longer time, as the accumulation of ether causes it to give running lines to the film in the direction of the dip.

5thly. The developer requires no alcohol to cause it to mix with the nitrate of silver; on the film there is no chance of staining in development; no curtains are seen at the depending end of the plate; and, although very intense, there is seldom any solarizing of the skies in landscapes.

The following is the receipt I find to answer best. I have not pushed it quite so far as has been stated; but possibly, with great care in the make of the alcohol, the proportions may be so.

Paper pyroxyline made at 130° Fahr., with equal parts of sulphuric and nitric acids, well

washed in many changes of water, and lastly, with two or three changes of *boiling* water:—

Absolute ether	. . .	$3\frac{1}{2}$ drachms
Absolute alcohol	. .	$2\frac{1}{2}$ drachms
Pyroxyline	. . . .	6 grains

Iodizing Solution.

Iodide of potassium	. .	12 grains
Distilled water	. . .	6 drops
Iodide of cadmium	. .	5 grains
Absolute alcohol	. . .	1 ounce.

2 drachms of iodizing solution to 6 drachms of collodion.

I have used a larger amount of alcohol than the above; but unless it is very strong (really absolute), it will be impossible to dry one end of the plate before the other becomes too dry before dipping in the bath.

FRANCIS G. ELIOT.

PROCESSES.

Honey-Albumen Process.

To the Editor of the Photographic Journal.

Dundee, 30th September, 1858.

SIR,—These Notes are written for the consideration of amateurs. The honey-process, in its simplest form, has been practised successfully in this quarter for some years; but there are certainly drawbacks, from the plates being moist, and from their liability to decomposition not allowing them to be kept with certainty for any length of time. The negatives by that process are, however, of an excellent quality for variety and delicacy of tone.

The late discovery of a simple collodion dry process led to experiment; and a friend and myself appear to have separately proved the complete efficiency of the following method. The pictures accompanying these notes will perhaps allow a correct judgment to be formed, and enable you to give encouragement to those who wish, with comparative facility, to record the beauties of nature's scenery, without the labour and expense of cumbrous apparatus.

The plate is sensitized in the ordinary bath used for negative pictures. It is afterwards drained until the surplus nitrate of silver almost ceases to drop off, and then aided by resting the corner of the plate on blotting-paper. A solution of honey and water is then floated backwards and forwards over the surface for about a minute. The plate is afterwards washed under a gentle tap for a minute or so, and drained for a little. A solution of albumen and water is then floated over the plate for a minute or more, and the surplus dropped off. It is again well washed under a tap, or by a gentle stream of water, for more than a minute. The plate is now to be placed vertically in a dark place on blotting-paper, in order to dry before being put into the slide for exposure.

The honey used ought to have been dripped purely from the comb; and two parts of water, or less, added, according to its consistency, and the solution well shaken and filtered—to be used before becoming acid. It is not necessary to pour on as much of the solution as will at once cover the plate; it is sufficient if, by after-waving, the whole surface is covered.

The albumen, with an addition of one-half or more of its bulk of water, is to be beat up entirely into froth, set aside to fall back, and then filtered through sponge. The albumen is poured on along the edge, and ought at once to flow evenly forward over the whole surface of the plate, by using the proper waving motion. The well washing of the plates before and after pouring on the albumen must be strictly attended to; as the slight washing in dishes, recommended by some, is sure to lead to provoking disappointment, by producing pictures marked and disfigured in various ways.

Experiment must prove the necessary exposure. A single stereoscopic lens by Ross (diameter 1 inch, diaphragm $\frac{3}{16}$ inch, and focus $4\frac{1}{2}$ inches) required six minutes. A single lens by Lerebours (diameter 3 inches, diaphragm $\frac{1}{2}$ inch, and focus 21 inches) required ten minutes. The time must be shortened or extended according to the nature of the subject and light.

The plate is dipped for a few seconds in a bath of water before development, which requires from four to fifteen minutes, according to the time of exposure and the quantity of silver solution (30 grains to the ounce) added to the developer, immediately before pouring it on. Slow development with a smaller quantity of silver secures more delicate pictures. With a proper exposure, a first strong developer will almost complete the negative. The developer is,—pyrogallic acid, 2 grains or more; glacial acetic acid, $\frac{1}{2}$ drachm or less; water, 1 ounce. Fix with hyposulphite of soda.

If there be not time to allow the plates to stand to dry,—and which requires from eight to twelve hours, according to the temperature,—they can, without any danger, be dried by the application of heat. I have frequently rested the plates on tin (but not coming immediately into contact with it, in order to prevent breaking), heated from below by a jet of gas. The plate is protected from reflected light, and dries and hardens in ten to fifteen minutes.

The all-important advantage of adding the honey solution is, to wash away effectually the free nitrate, and especially to secure the delicate half-tones, that cannot be obtained by using albumen alone.

The plates do not appear to deteriorate in any way by being kept; for those nearly a month old produced equally good results, although treated exactly in the same way as plates prepared on the preceding day. On principle, these plates should keep equally well for a delayed development; but hitherto not more than four to five days have been allowed to elapse before developing.

The collodion and bath which produced good wet pictures have answered both for the honey and the above processes. The same bath has been used for about two years, adding occasionally some solution of the original strength of 35 grains of nitrate of silver. Those skilled in the preparation and qualities of collodion, however, consider that it is much preferable to use one produced at a high temperature, and of a porous or powdery nature.

The preceding process seems to be very certain, as scarcely a plate has been lost from any defect in the method, which may be styled the *Honey-Albumen Process*.

JOHN STURROCK, JUN.

*** Our Correspondent has forwarded us, with his communication, a view of Glammis Castle, Forfarshire, which speaks satisfactorily for the success of the process which he has described.—ED.

Fothergill's Process.

To the Editor of the Photographic Journal.

Oct. 7th, 1858.

SIR,—I thank you very much for your note. I beg you will keep the book, as you wish, for the purpose of showing the views taken by the "Fothergill Process" to your photographic friends.

To an amateur like myself, a good dry process for landscape photography is a great *desideratum*. The recent discovery by Mr. Fothergill gives promise of great utility in this respect; it is simple in its application, and is more perfect than any other I am acquainted with.

I commenced working this process in April, and have been using it exclusively in practice ever since, the result of which you have an opportunity of observing in the pictures forwarded for your inspection. Full instructions for this beautiful process have already been published in the Journal; its success depends upon the preparation of the plates, which must be conducted with the greatest possible care throughout, and the strictest attention given to the manipulation in *minute particulars*, especially those relating to the first washing of the plate after its removal from the sensitizing-bath. The plan of washing I adopt for a stereoscopic plate is with half an ounce of water for half a minute, or thereabout; the water is poured on at one corner in the gentlest manner possible, as described by Mr. Keene in his pamphlet, and made to pass round and about the plate evenly and as smoothly as can be done, for the purpose of removing from the surface of the collodion film the free or otherwise superabundant nitrate of silver.

There is one thing which I have found of essential service in my practice during the last three months: it is the artificial drying of the plates soon after the albumen has been washed off. When a sufficient number of plates are finished, I arrange them in a small cupboard, each plate resting at diagonal corners upon some clean blotting-paper, then placing a large suitable bottle with boiling-hot water near to them; the heat which radiates from this assists in drying them thoroughly and more quickly than they otherwise would, which I believe is most essential to ensure their keeping qualities, as well as adding materially to the sensitiveness of the film.

I shall be much pleased if either yourself, or any of your numerous contributors, would explain, in an early Number of the Journal, the *modus operandi* whereby the sensitive condition of the plate is so remarkably preserved. I wish to know,—

Whether any combination takes place between the albumen and the silver? If so, is it chemical or otherwise? that is, can there be such a compound produced as albuminate of silver?

Or does the albumen merely, by apposition, fill up (in the same way as sugar, honey, gum, &c.) the porous cells of the collodion, and afford an attenuated covering whereby a sufficient quantity of silver is retained after a *gentle* washing, and thus the albumen, *per se*, protect the sensitiveness of the plate?

To have this point clearly explained would afford me, and doubtless many others of your readers, much satisfaction.

THOMAS EBRAGE.

Fothergill's Process.

To the Editor of the Photographic Journal.

Leamington, Oct. 7th, 1858.

SIR,—Many thanks for your kind notice in the last Number of the Journal, and for the information in your reply.

My bath is now as good as ever, as the enclosed print will show you; it is taken by the "Fothergill Process," which is admirably adapted for copying prints and pictures.

From having given it a great deal of atten-

tion, I am able to say that no one need fail with it who will use Keene's collodion and follow his instructions. Many of the other instructions I have seen seem to have been written in ignorance of the principle involved, which is simply *the protection of the sensitive film from the action of the atmosphere* by a varnish of albumen which is impervious to air, but sufficiently transparent to allow the rays of light to pass through with tolerable freedom. The washing, therefore, in the first instance, should only be sufficient to remove any excess of nitrate which may remain after withdrawing the plate from the bath, and which, if allowed to do so, would cause patchy stains on development. The second washing equalizes the thickness of the albumen film, and removes a great portion which would otherwise impede the action of light. This second washing, therefore, may be continued for a long time with benefit, providing it is *done gently*, and not thrown on with sufficient force to penetrate through the wet albumen to the film below; for the thinner this coating of albumen, the less the exposure required, and the quicker the picture is developed.

The supposition that an albuminate of silver is formed, I am sure is a mistake.

The plates should be thoroughly dry before they are used; and, as they will keep many months unimpaired, I never use them until several days after preparation; the action is then equal all over.

A very weak developer is best (1 grain to an ounce): the strong solutions recommended by some writers will risk the destruction of many a good picture. I have said, "Use Keene's collodion;" I can, however, get a picture with *any* kind; but those of a *contractile* character split off on drying, and those that have become *short* by long keeping require very long exposure. Doubtless other makers will produce a similar quality, but I know that made by my townsman to be uniformly excellent.

AN AMATEUR.

MISCELLANEOUS.

Photography, Artistic and Scientific.
By HENRY P. ROBINSON.

[Continued from Page 15.]

Composition.—A person unacquainted with photography, if such an individual exists, on looking over the specimens of many portrait photographers, would suppose there was only one position in which a sitter could be placed, namely, the one elbow on a little round table, with the hand twisted as near the body as possible, the other hand placed on the knee, with the elbow stuck stiffly out at an angle, the legs crossed and turned flat to the camera to satisfy the exigences of focus, the face quite full, and the eyes staring fixedly into the lens. The chair on which the sitter is placed is of a kind only to be met with in photographic studios, and the carved back usually comes behind and is more conspicuous than the head, the whole presenting a most awkward appearance seldom seen in nature, and not to be mentioned as art. It would be almost worth while giving a sketch of this, that it might be avoided in future, but a woodcut is scarcely necessary when so many originals might be seen at the nearest portrait rooms. The effort to alter this position will suggest new ideas, and a study of the productions of the best portrait painters will materially improve the photographer. We have a great authority for copying the works of others: Sir Joshua Reynolds, in his discourses, says, "Invention is one of the great marks of genius; but if we consult experience, we shall find that it is by being conversant with the inventions of others that we learn to invent, as by reading the thoughts of others we learn to think."

The great charm of a good portrait is simplicity of form, an harmonious flow of lines, and a perfect balance of light and shade, together with a suitable expression. Avoid the introduction of too many accessories, let everything be subordinate to the head. Vases of flowers, elaborate patterns on table-covers, books, and the great variety of trifles sometimes seen, are all very well when surprise is intended to be given by the minute detail afforded by the lens; but the time for all this has passed, and nothing can be admired that has not something better to recommend it than a crowd of useless ornaments: we now look rather for fine expression and a good *pose*. The sharpest detail is worse than useless if a breadth of light and shadow be not preserved, everything should be withheld that does not assist the composition, or help to tell the position in life of the person represented. The forms should flow into each other in graceful sweeps, there should be no abrupt or angular lines; and if a straight line be admitted it should be in the background, as a foil to the grace of the figure.

Perhaps the most perfect general form of a well-composed picture is an irregular pyramid with a curved base; care should be taken that no part appears to require support, this fault is often seen in figures sitting sideways in a chair; this position requires a table or some other article behind the figure to fill up the blank space behind the chair.

The position of the figure on the paper is a matter for consideration. If a tall person is to

be represented, it is well to place the head near the top of the picture; if the sitter is short it might be placed lower on the paper: this plan will be found to give nearly a correct idea of the stature of the original. When the figure is not placed exactly between the sides of the picture, more space should be given before the the figure than behind it.

It is often said that photography exaggerates the size of portraits: this is a disadvantage inseparable from all attempts to represent life, in consequence of the limited space of a picture when compared with nature. Enclose a face with a frame so as to cut off surrounding objects, and it will look much larger than it really is.

If photographers generally would attend more to composition and expression, and consider their science as only the means to an end, and that end *art*, they would be saved the infliction of such extravagant articles as the one which appeared in the Art Journal of September, " Photography for Portraits," by Mr. Ronald Campbell. It is a difficult matter to wade patiently through this long and heavy dialogue with its bad jokes and dismal attempts at wit; it is a great comfort that Mr. Campbell has evidently seen nothing but street photography. He takes a sixpenny positive, and gravely criticizes it by the side of a Reynolds or a Rembrandt. The author denies that photographs can touch the heart as Painting, Music, Statuary, and Architecture can. Perhaps he will read the two last lines of his dialogue and apply them to himself.—" When a man will only take the trouble to *think*, the *interest* is sure to follow." Mr. Campbell will possibly deny the power of thinking to the followers of the art he is so violently opposed to. If he will take the trouble to search out some of the best examples, and *think* himself, he will be surprised to find that photography is not merely a " servant of servants," " a revolving cylinder of a patent music-box compared with the heartstrings (!) of a Paganini violin," "a street organ compared to music, " a wax beauty in a barber's window compared with Michael Angelo's sculptures," that it *does* produce something better than " colourless stains," and that it does with truth " arbitrate for itself the noble rank of equality with the arts."

We agree with Mr. Campbell, that to mingle the Dutch with the Italian schools is to join contrarieties which cannot subsist together: but photography has nothing to do with Dutchman, or Italian, or with any school. Photography is not content to follow, but has traced a path for itself beside the other branches of the fine arts, and nobly maintains its way.

To the Editor of the Photographic Journal.

Westrock House, Leamington,
September 28th, 1858.

Sir, — On reperusing my letter in the last Journal, I am led to regret that it certainly would appear to convey the impression of a claim on my part to having originated the new dry process, a claim which exclusively and justly belongs to Mr. Fothergill. The letter, as you know, was written in answer to a request made by yourself, and was not intended for publication. Unfortunately, the mistake of your compositor in substituting the word " visited " for the word " invited," would give a reading implying that the discovery was first made at my house, and there exhibited to my friend Mr. Fothergill. My letter, however, stated (as you will find, and I have no doubt will confirm, on again examining it) that I was the person " *invited* " to witness, &c. The mistake thus unfortunately made gives force to one or two other parts of my letter, which, taken as a whole, may be misconstrued into a claim which I would be the last person to make, as it would be both false on my part, and unjust towards Mr. Fothergill. The only claim I can set forth in the matter is the having been the first to carry out Mr. Fothergill's discovery, and certainly to prove its whole merit and importance by shortening the time of exposure and development,—a result which doubtless Mr. Fothergill would have equally arrived at had he not at the time removed from this place to London, and so made a break in his course of experiments. The experiments which I was making at the time when Mr. Fothergill made his discovery, were with very diluted portions of sugar of albumen and of honey respectively, and all with a view to one sensitizing. The simple and beautiful discovery of washing off the superfluous albumen was Mr. Fothergill's, and his only.

J. Prichard.

Stereoscopic Pictures from Flat Surfaces.

We have had laid before us some productions of an invention which opens up an entirely new field for stereoscopic pictures, by rendering views taken from paintings or engravings as solid and apparently real as if they had been photographed from the subjects which the paintings represent. Till now, no stereographic cards of engravings have been made, for the good reason that they would not have had any more relief than the engravings themselves, and would have quite wanted the charm of apparent reality which renders the stereoscope so popular. If this invention can be applied to any painting or view on a flat surface, which from the specimens we have seen we have no reason to doubt, there will be

produced by-and-by stereographs of many of our most remarkable pictures, which will have a charm by this means added to them never dreamt of by their producers. This will be doing a service of no small value to the man of moderate means. The stereoscope has been called the poor man's picture gallery, and it is indeed so, placing within the means of a poor household the power of possessing excellent transcripts of nature and works of art, and which possess that essential quality for becoming favourites in small establishments—the taking up of little house-room. Stereographs of subjects quite beyond the range of ordinary photography will by this means be rendered possible. No exertion could gather together characters with the requisite expression and with all the adjuncts of suitable scenery such as are found in even an ordinary painting, and retain them still until they were fixed by the camera. If the invention becomes recognized and employed it will no doubt exercise great influence on artists, for imperfections in perspective or drawing are rendered painfully apparent in the stereoscope, and the author of paintings of merit likely to come under the stereoscope will feel this. The invention is by Mr. John Sang, and the subjects he has chosen to illustrate it are Mr. Cruikshank's etchings of 'The Bottle.' The stereographs are exact transcripts of the etchings, but to their wonderful truth of expression there is added an appearance of reality perfectly startling, every detail of the composition standing out in relief. These stereographs, which are dedicated to Mr. Cruikshank, are modestly called an attempt to render the etchings stereographic, but we think the attempt very successful.—*Times*, Oct. 19, 1858.

To the Editor of the Photographic Journal.

London, Oct. 7, 1858.

Sir,—In most of the collodions sold to the public, the iodide of cadmium is *not* the iodizing material, although it is on all hands agreed that it is the most stable for the purpose.

Being but an amateur, my difficulties are somewhat similar (in respect to the collodion only) to those of your correspondent "Amateur" in your last Number, page 32.

I have used ——'s collodion; but after four days the sensitiveness soon decreases, and the quantity of old useless collodion now on hand is very great.

I now use ——'s collodion, which keeps good longer; but as I only use it now and then, the waste is still considerable. I have studied the papers by Mr. Hardwich in your Journal, and from them I gather that the faults of the cadmium collodion are want of intensity, and not flowing well over large plates.

As portraits by amateurs are generally on small plates, this latter is not so great an objection.

I should like to know if there is any further objection to the use of collodion iodized with cadmium for landscapes and for portraits. Some objection there must be, or it would not be so generally avoided by those who make for the public.

If you would answer this in your next Journal, it would much oblige. Sampson.

[Having used collodion largely which has been prepared with the iodide and bromide of cadmium, we are decidedly of opinion that it has many advantages. Beyond its well-known quality of keeping longer than collodion otherwise prepared, we have always succeeded in obtaining pictures more perfect in half-tints than with the other iodides. Occasionally there has been a degree of feebleness from excess of half-tones, but easily remedied by rapid development, and the addition of a few drops of the bath to the developer. The alleged failure in its flowing, which we have not experienced, would be remedied by the addition of a few drops of chloroform. By some it has been said that collodion so made becomes glutinous, and is apt to throw the nitrate-bath out of order by the formation of nitrate of cadmium. We think, for landscape photography especially, that it should be generally used. That other members of the Society, as well as yourself, may see the result of collodion prepared with cadmium, we have placed in our reading-room a negative for inspection.—Ed.]

BOOKS RECEIVED.

A Guide to Printing Photographic Portraits, Draperies, Backgrounds, &c. in Water Colours; with concise Instructions for Tinting Paper, Glass, and Daguerreotype Pictures, &c. &c. By A. N. Rintoul. Third Edition, 1858.

The American Journal of Photography and the Allied Arts. New York.

Manual of Photography, adapted to Amateur Practice. By Geo. B. Coale. Philadelphia, 1858.

[Reviews of books and photographic works of art in our next Number.]

ANSWERS TO CORRESPONDENTS.

Gentlemen desirous of admission into the Photographic Society, are requested to communicate with the Secretary, 1 New Coventry Street, Piccadilly, W.

P. P. Ceth.—We cannot undertake to write your advertisements. Your proper course will be to appoint some respectable house in London to sell the varnish you have invented.

S. B. (*Hunton*).—1. We have never heard that any of our friends have been troubled with "Blisters" in the Fothergill process. 2. Some of the finest pictures in colour we ever saw were produced by a toning-bath containing glacial acetic acid. We discontinued it because it was said such pictures would not be permanent; but, after four years, there seems to have been no change in their appearance. 3. See answer to A. Z. 4. Ox-gall is sold at the artists' colour shops, in little pots ready prepared; it keeps good a long time.

G. B. (*Margate*) states that all glass may be cleaned for photographic use with much certainty by using dilute sulphuric acid, one ounce of acid to the quart of

water. Its efficiency must depend on the nature of the contaminating substance. We believe it has been before recommended.

A Subscriber has sent us the following "Prospectus of the Glasgow Practical Photographic Society." It appears to be well calculated for the mutual benefit of its members and advancement of the art; as such we print it, that other localities may probably benefit thereby:—

Prospectus of the "Glasgow Practical Photographic Society."

"1st. The Society shall be called the 'Glasgow Practical Photographic Society,' and shall consist of not more than 40 members.

"2nd. The annual subscription, from 28th May till 28th May, shall be one guinea, payable in advance, which entitles each member to the use of the glass-room and other premises (four apartments in all), as well as of a ½-plate lens, camera, stand and chair, at their convenience, and also to peruse the principal journals and guides; each member to provide his own chemicals, cloths, &c.

"3rd. Board of Management to consist of Chairman, Treasurer and Secretary, the Society a committee, six being a quorum. The chairman (or in his absence, the secretary) to be convener of all meetings; and he shall, on receiving a written request, stating the object, and signed by at least 10 members, convene a general meeting of the Society. The Treasurer to collect the subscriptions, and pay the accounts due by the Society, previously passed by the Board of Management. The Secretary to attend all meetings, write the minutes, and conduct the correspondence of the Society, or, in his absence, to provide a substitute to write the minutes for his engrossing.

"4th. On no account can a member use the premises professionally.

"5th. Meetings for mutual improvement, reading essays, or discussion, to be held as agreed upon by members.

"7th. No member to use any other member's property, without such member's express sanction; any member infracting this rule will be liable in a fine to the funds of the Society, besides replacement of such property, if required by the owner.'

J. W.—First try another lens before you change your locality.

A Subscriber.—Develope your pictures either with the protonitrate or with sulphate of iron. You may then obtain any degree of brilliancy you desire.

Geo. B. Coale (Baltimore, U. S.).—You shall receive a private communication as soon as the information you seek can be acquired.

An Old Subscriber.—1. You should become a Member of the Society; although not personally known to you, the gentleman's name you have mentioned would be a sufficient guarantee for us to propose you as such. 2. Stereographs for colouring should be printed on plain paper (unalbuminized), and afterwards coloured with water-colours, selecting the most transparent ones for that purpose. They may afterwards be hot-pressed, or floated on plain albumen, and when dry, ironed. They may be also coloured on albuminized paper, if the colours are mixed with plain albumen instead of water; but the result is not so good.

S. B. (Basingstoke).—We have complied with your wish.

A Correspondent asks who was the first to use the single wash in preparing the iodized paper in the calotype process, and the DATE of its publication? If any of our readers can give us the information, we shall feel thankful.

A Correspondent (Kendal).—If you will describe the transfer and crystal varnish, we will insert the communication. Any advertisement you must send yourself to the publishers. The transferred picture from glass to paper is satisfactory. You will probably lose the iridescent colours by using a thicker collodion.

Captain Stileman (Winchelsea).—Your request shall be attended to.

B. B. (Regent Street).—The collodion supplied by the maker you name is to be relied on. The fault is probably in your bath, which may be acid, and, if so, will account for the slowness. We have lately tried some pyrogallic acid for development, which was very inert; a fresh sample ensured success. You will derive advantage at this time of year by using your developer slightly warm, from 80 to 90 degrees. A specimen would better enable us to judge than any description you can give.

R. Dart (Churston Ferrers).—We thank you for the picture taken by the turpentine waxed-paper process. It exhibits promise of good results to be derived from that process, and we have placed it in our reading-room for inspection of our members. In reply to your question, we believe that the focusing-glass is too far from your lens. You can easily determine that by focusing a nearer object, which, if represented more distinct, will be a proof that it is so.

J. H. S. (Slade Aston).—There is no objection to your drying the hyposulphite of soda. It keeps perfectly well in paper; but be very careful it does not come in contact with any of your other chemicals.

A. Z. (Loughborough Park).—1. The high gloss on the stereoscopic slide is produced by gelatine. Hot-pressing is a great improvement, and is done by the trade very cheaply. 2. Ivory treated as paper will produce very fine positives. Immerse a piece of ivory in water 1 ounce, common salt 15 grains, for one minute; dry, float on nitrate of silver 60 grains, water 1 ounce, for four minutes. The ivory immediately assumes a deep yellow colour. Print rather darker than would be requisite for paper, and tone in the usual bath. The yellow colour disappears, and a beautiful black and white picture is the result; if over-printed, a very weak solution of cyanide of potassium will improve it, but it must be again toned. Artificial ivory is bad for the purpose, it will not dry flat.

W. S. (Croydon).—Use the bromide of cadmium instead of potassium.

Amateur (Army and Navy Club).—See answer to A. Z.

C. F. Oldfield.—The Council of the Society coincide in your opinion. There is no wish to exclude any meritorious picture at the forthcoming Exhibition.

J. V. T.—Your question has been often answered in our back Numbers. Read Mr. Thomas's paper in the Number for August.

W. M. Macartney.—Thanks for your communication, which is in type; but we have delayed its publication for Mr. Hardwich's observations thereon.

J. B. Spencer.—As your communication requires a wood-cut, it cannot appear until our next number.

John Parker (Barnstaple).—Your communication is in type, and shall appear in our next.

An Old Subscriber (Chester).—Want of space compels us to defer our replies until the 6th of next month.

Communications received from—Mr. Willett, Bristol; Lyndon Smith; Murray and Heath; Roger Fenton; Sir W. J. Newton; Mr. Ebbage; Dr. Mansell, Guernsey; Alfred Silvester; J. F. Campbell.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street, E.C.

THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 72. NOVEMBER 6, 1858.

Our readers will be pleased to learn that the Gallery of the Society of British Artists in Suffolk Street, Pall Mall, has been engaged by the Council for the purposes of their next Exhibition, which will be opened during the first week of January, and continue so until the 1st of March, after which time it is probable that the entire collection will be transferred to an appropriate apartment in the Crystal Palace. The Managers of that Institution, we are informed, are disposed to treat the members who exhibit their works at the Palace with their accustomed liberality; and we hope we are not wrong in stating, that a free pass and admission will be accorded on that occasion to exhibitors, being members of the Society.

The appeal in our last Number to all engaged in photographic study for contributions illustrating particular modes of manipulation, has not been in vain; amongst others, Mr. Dilwyn Llewelyn has presented the Society with some beautiful specimens done by the oxymel process, which he recently so admirably described in the pages of this Journal. They are suspended in the Reading Room for inspection, and for their beauty command deserved admiration. If others are as successful as Mr. Llewelyn has been, photography has much to thank him for.

In our September Number, we published some observations on the influence of photography in reference to the art of painting miniatures, which article was penned in the fair spirit of observation, and not in "a sort of exultation" that photography had superseded miniature painting, as our friend Sir William Newton, in what he terms an "official communication," attributes to us. We must positively decline the insertion of his communication, but assure him most sincerely, that no personal disrespect was intended towards him; our wish to make this public acknowledgement must be an excuse for alluding to that which now numbers with the past.

From the Photographic Institution, 118 New Bond Street, we have received a series of instantaneous photographic pictures, executed by Mr. George Downes, for the stereoscope, surpassing all we have hitherto seen as instantaneous representations of the Coast, with Waves of the Sea, Shipping, &c.; and from Mr. J. Elliot five pictures of "The Sacking of the Jew's House," which for their delicacy of treatment and photographic excellence, are deserving of every commendation. It gives us great pleasure thus prominently to recommend these works to our readers; for they are quite a bright spot to look on after the gross and vulgar representations of domestic life now "so lucratively" (to make use of the words of the perpetrators of one of these absurdities) selling in the shops of those whom we had hoped would have spurned such gain.

As will be seen from the report of the first meeting of the Society, the subject of "Carbon Printing" is to engage the members at their next assembling. We shall be glad of any communications or assistance by contributions of specimens on that occasion; at present we have only been fortunate enough

to receive one, and we were then forcibly reminded of an incident occurring soon after the late Mr. Archer made known his Collodion process, which, humble as it then was, has now almost superseded all other photographic modes. A portrait had been taken, which we admired with a sort of enthusiastic blindness; but showing it to one whom we fully expected to congratulate us, he exclaimed, "Call that a picture! I would not pick it out of a mud cart." We have been favoured with the sight of but one specimen of the Carbon printing, and we trust that the same relative progress will be, or has been made in Carbon printing, as has taken place in Collodion pictures. If the process is as valuable as stated, why not allow a judgment to be formed by actual inspection of the pictures now produced?

We have this day printed Mr. Fox Talbot's specification of patent for his new process of Photographic Engraving, and remind our Members that the beautiful specimens he so kindly sent are still at the Society's Rooms for inspection.

Circumstances have prevented us up to the present time from giving in our pages an account of what took place, at the Leeds Meeting of the British Association for the Advancement of Science, in respect to photography. Full reports appeared in the daily papers, and no doubt were read by all interested; yet as a *record*, we think it right that the report should be preserved in our own columns.

PHOTOGRAPHIC SOCIETY.

Ordinary General Meeting.

November 2, 1858.

R. Fenton, Esq., in the Chair.

The Chairman read a note from Sir Frederick Pollock, in which it was stated that, in consequence of the Meeting falling upon the first day of Michaelmas Term, the Lord Chief Baron would not be able to attend and take the chair.

The Chairman then introduced the new Secretary and Editor of the Society's Journal, Dr. Diamond, to the Meeting, and stated that he would be welcomed by the Society with the same feeling as he was welcomed by the Council, and hoped his appointment would bring increased prosperity to the Society. [Cheers.]

The minutes of the last Meeting were then read and confirmed.

Major J. P. Mitford; C. Russell, Esq.; Captain Stileman; Wm. Hy. Bolton, Esq.; Hy. Bright, Esq.; C. Clifford, Esq., and J. A. Branfill, Esq., were elected Members of the Society.

Mr. Delamotte exhibited a large view of the Nave of the Crystal Palace, recently taken by himself, showing much beauty and detail—Mr. Dilwyn Llewelyn, some choice specimens, the effect of his oxymel process—Mr. Malone, a series of Photo-lithographs, the works of M. Poitevin of Paris—Messrs. Murray and Heath, a Monster Camera of very beautiful workmanship, and with a new adaptation of hinges, by which its firmness is much secured and portability accomplished: this may still be inspected at their own house of business.

The damaged picture which Mr. Robinson of Leamington permitted to be exhibited, as showing the importance of early fixing after printing, and alluded to by Mr. Shadbolt in the last Number of the Liverpool Journal, attracted much attention.

Mr. Reeves Traer, M.R.C.S., &c., read a paper "On the Photographic Delineation of Microscopic Objects." (See p. 55.)

Mr. Grant (of New York).—I should wish to suggest, as applicable, an improvement patented by Mr. Harrison, of New York, termed the "Scroll movement," by which you can move the hundredth part of the sixteenth of an inch without any slipping whatever. [Mr. Grant explained the mechanism by reference to a large lens adjustment.]

Mr. Hughes.—I am in possession of two of Mr. Harrison's lenses which vary in their foci. They are the second or third lenses that I have had that varied, and varied considerably. I also work with Ross's, and they do not vary. I think the coincidence of the foci is altogether an English notion.

Mr. Shadbolt.—With regard to the scroll-movement, which is an ingenious adaptation of the wedge, I doubt whether it would do for microscopic objects; for, however perfect they may be, we find they shake.

Mr. Grant.—What made me suggest this was that Mr. Pike, our most celebrated optician in America, has adopted it, and uses it for all his best instruments, even on the very smallest scale.

Mr. Malone.—Mr. Claudet maintains that every object-glass varies according as the light varies, and therefore that it is impossible to have an object-glass so corrected as to be correct in all circumstances.

Mr. Shadbolt.—I think that Mr. Claudet is under a misapprehension in consequence o

his using a Voigtlander lens, which varies in its chemical and visual foci. I believe it to be perfectly possible to correct a lens so as to be fitted for all times and seasons. I have had some conversation with Mr. Claudet, and requested him to show me how he operated. The moment I saw him operate, I came to the conclusion that it was owing to his not being thoroughly careful in the way in which he focused. The way he worked was with an ordinary magnifier. Now he sees the object on the ground glass, not *through* the ground glass, and the least movement will alter the focus; and it is only by a glass of high power that you can be certain that you have got your focus correctly.

Mr. Malone.—Mr. Shadbolt has put it upon a question of manipulation. Mr. Claudet is not a manipulator. Sir David Brewster agrees with Mr. Claudet. He could hardly see a probability of a lens corrected for white sunlight being affected in precisely the same manner by a sunlight which has passed through an absorbing medium, which is no longer sunlight, for it has certain rays abstracted.

Mr. Shadbolt.—I may at once remark that Mr. Malone has put it upon quite a different footing than that upon which Mr. Claudet has put it. I quite agree that the amount of correction for different sources of light, or, what amounts to the same thing, sunlight from which some of the rays may be filtered out, must be different; but, if he contends that the difference between sunlight in the morning and evening, or in summer and autumn, must upset the lens, I must differ from him.

Mr. Malone.—Mr. Claudet finds that focusing in the morning gives a certain result, but focusing in the afternoon does not give the same result; he does not attempt to define the cause, but merely suggests that the sunlight of the morning may have passed through different absorbing media. I have worked with Mr. Claudet for two years.

Mr. Watson.—I have very frequently remarked that in the morning a lens is very different to what it is in the afternoon, particularly as it gets towards sunset; and, particularly if there is a tendency towards yellow-golden rays in the atmosphere, you cannot get such a sharp picture as in the morning.

Mr. Hughes.—Mr. Claudet was the first person who called our attention to this difference in the foci, but I cannot help thinking that Mr. Claudet has referred to his own practice, and finally carried his theory so far that he has got it beyond the range of practice. Theoretically I think we must take it that, if the sun's rays pass through the clouds, of necessity they pass through a medium which contracts some of the rays, and the same in passing through the glass of our own rooms. If this variation is sensibly and materially to interfere with our arrangements, it will cause us to readjust our instruments every day and hour. A great deal has been said about the difference of foci; and I believe very excellent lenses have been condemned, simply because they have not agreed. I have worked, and many others have done the same, for many years with lenses that did not agree. I think it is a question of cabinet-work. Now the lenses that are constantly being sold as having their foci coincident only coincide at certain distances; if those distances are exceeded, their foci vary exceedingly. I put the question to Mr. Ross one day, "Here is a given lens: if I take a plate of a given size, supposing I take the picture of the same size as the object itself, will the two foci agree? and he would not say "yes." I work very much in copying and reproducing, and I have this fact constantly brought home to me, that if I enlarge with Harrison's lenses, it varies at a certain given distance for portraits; if I make an image of the same size, it varies very considerably; the more I enlarge, the greater the diversity.

Mr. Watson.—With Mr. Ross's lens I cannot get so sharp a picture in a yellow light as a white one.

Mr. Shadbolt.—Mr. Claudet always uses a lens that differs in its chemical and visual foci.

Mr. Malone.—He affirms the proposition to be a general one.

Mr. Shadbolt.—The practice seemed to me to go upon a lens not absolutely corrected, because a lens, not having its chemical foci brought up, its visual one is absolutely an uncorrected lens. If that be the case the variation will be great. Mr. Hughes has hit the question without being aware of it. If we take a couple of prisms, one being larger than the other, that of flint-glass, and this of crown-glass, you have an exact equivalent of the lenses; a ray of light falling *here* is refracted in *this* direction, and there is a certain amount of extra refraction allowed; the degrees in which the spectrum is pulled out by a thick wedge of one, and a thin wedge of the other, equalled; I can make nothing more nor less of it, look at it as long as one will.

Mr. Malone.—I must observe that Mr. Shadbolt will assume that Mr. Claudet affirms this proposition because he uses lenses not corrected. Now Mr. Claudet uses all lenses, even the new Petzval lens; therefore you must treat the proposition as one that is true, though I neither affirm nor deny it.

The cordial thanks of the Meeting were then accorded to Mr. Reeves Traer.

The CHAIRMAN called attention to the various specimens produced by the oxymel process, and by Fothergill's dry process. There were also some specimens produced by Mr. Fox Talbot's new modified method; he has written to the Secretary, saying that the specimens are mere essays, to give some idea of the nature of the invention. Mr. Malone has also some specimens.

MR. MALONE.—In consequence of the publication of Mr. Fox Talbot's specification of the modification of his former patented process of engraving, I thought it would be interesting to bring some specimens which had some basis to start from; they are by M. Poitevin of Paris, and I think it must be admitted that they form quite a new era in the art. Those specimens of M. Poitevin's will bear comparison with any results which have been produced in any part of the world. They are photo-lithographs, produced by a mixture of bichromate of potass and gelatine, or of bichromate of potass and white of egg. The object to be copied is placed upon a stone so prepared, and it acts in such a manner, that the surface shall be so altered, that afterwards, upon applying water, the water shall take on to certain parts, as upon the ordinary lithographic stone. The surface appears to be altered in such a manner that it will receive the printer's ink, when you have simply to lay the paper upon it, and pass it through the ordinary lithographic press, and thus print it without any engraving or loss of time, and have the result at once. It will at once be seen that this is an object that can be carried out upon a large scale. *Here* is a picture of the designer's drawing, copied by the ordinary photographic process, then transferred to the stone, and printed off. By this method the original designer's touch is more clearly conveyed than if this drawing were placed in the hands of another artist to print upon the stone, which is a very important matter. *Here* is a specimen which has been untouched. We have *here* a photo-lithograph of a bone, reproduced by the photo-lithographic process in such a manner as to be easily mistaken for the ordinary lithographic process, it being in coloured ink. This process has been patented in this country, and the particulars have been kept secret. In this case I endeavoured to learn as much as I could from M. Poitevin. He referred me to M. Ed. Becquerel, and M. Becquerel explained to me that M. Poitevin was not a man of means, and he considered that he was justified in concealing it. He said he was acquainted with all the process, and assured me that it was exceedingly simple, and occupied only a few minutes. Still we have this fact, that the stone is prepared with bichromate of potass and gelatine. This certainly seems to me to be a process of very great promise. It has been suggested that the light oxidizes the gelatine in such a manner as to give rise to a resinous substance. I thought that the chromium combined with the gelatine. Dr. Franklin informs me that he thinks a resinous substance is formed which resists the water on the stone, but allows the adhesion of the printer's ink.

The CHAIRMAN.—Here is a process handed up to me which I will read. "The method I find quite easy is as follows:—I make a solution of gum arabic in water, about as thick as molasses; with this I grind on a glass or in a mortar a sufficient quantity of calcined lamp-black, ivory-black, or other pigment. When the mixture is thorough, I add in the dark an equal part, by measure, of a saturated solution of bichromate of potash in honey, diluted with an equal quantity of water. The whole is now to be carefully mixed by stirring or grinding. This intimate mixture is a point of the greatest consequence. The paper I prefer is the highly albuminized. The mixture is laid on by flinting, or with a large flat brush; dry in the dark. The printing is performed in the usual way, only using about half the time for ammonia-nitrate paper; after exposure the print is soaked ten minutes or more in water, and then exposed under a stream of water until the whites are fully brought out." I am sure I should be very glad if this matter could be brought before the Society upon another occasion, and it would give an opportunity for its being thought of previously. I am sure I know gentlemen who can say a great deal about it, and probably may throw a good deal of light upon the subject, which will be more likely to terminate well for the interests of photography than the present desultory remarks.

It is suggested that this subject be brought before the Society at the next Meeting; and I am sure the Secretary will be happy to receive any papers; and Mr. Malone suggests that any person acquainted with any carbon process may be asked to assist us.

The next Meeting will be held on December 7.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion

must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith. The same proviso extends to communications to the Editor.

On the Photographic Delineation of Microscopic Objects. By J. Reeves Traer, M.R.C.S., &c.

The application of the photographic art, to which the following remarks more especially apply, is undoubtedly one of the most beautiful and interesting with which its followers are acquainted.

Thanks to the modern popularization of science, most people now know, that in each humble plant that thrives in every hedge, there exists a diversity of beautiful minute structure, an examination of which prompts the mind to venerate as well as to admire; while every insect, indeed the whole of animate creation, teems with marvels for the student's eye, which show him how wondrously the Creator's power has arranged and ordered all portions of each economy, whether of high or of low type, so that its intended functions shall best be carried on.

To delineate with the accuracy of photography some of these beautiful structures must surely be both interesting and instructive; and I regret that I have not had opportunities lately of preparing more numerous specimens for your inspection, but I trust that the few which I shall have the pleasure of laying before you will be sufficient to illustrate my remarks, and to prove how easy it is to obtain magnified representations of microscopic objects.

The first difficulty I met with was caused by my attempts to adapt the body of my microscope to a camera. I had read of successes obtained by means of blackened tubes, and of course tried that method, but must confess that I found it both inconvenient and unmanageable. Finally, when in Paris, I had some conversation with M. Nachet, the intelligent microscope-maker of that city; and the result was that he made, from my description, the instrument I have ever since used, and which has thoroughly fulfilled the purpose for which it was intended.

The necessary indication in the construction of such an instrument is to adapt the essential portions of a microscope to a camera, viz. the object-glass, the stage, the mirror, and an adjustment. These are so arranged in the apparatus which I use, that the whole screws bodily in the camera, and thus becomes entirely under control.

The first of these essential elements (the object-glass) requires some consideration. I would advise any person about to purchase one to go at once to a good maker; he will have to pay a good price for it; but as the whole success of his microscopic study depends upon the excellence of the "glasses" he uses, I am inclined to think that no one will regret the expense, seeing that he will most likely possess as good an article as modern intelligence can produce. Of the stage little need be said, except that it should be of sufficient size, firm, and furnished (if intended to assume a perpendicular position) with a "spring-clip," or some other contrivance which will hold firmly the slip of glass on which the object is mounted. I am of opinion that what are called "stage-movements" are expensive luxuries, and not essential to the instrument; for with a little practice the hands will soon be found to become thoroughly educated, and capable of moving the object with the greatest delicacy. I found that the mirror originally adapted by MM. Nachet was too small, and I now use one of 2½ inches diameter. Two adjustments, a coarse and a fine, will generally be found to be necessary; the former for focusing when using the lower powers, and the latter when the higher are employed. The milled-head belonging to the fine adjustment may be marked into a certain number of divisions, to enable the photographer accurately to give it any portion of a rotation that he may find necessary, should the chemical and visual foci of his object-glass not correspond. There is also an arrangement on the distal side of the stage, which allows me to fix an inverted object-glass in the track of the rays of light, and thus condense them on the object itself.

I will now explain as briefly as possible the *modus operandi* I adopt; and from that description you will, I hope, fully understand the applicability of the apparatus I have described. Not having a "glass room" at my command, I operate in the open air, and commence by placing my camera on a firm table in the sun, so that its long axis is identical with the sun's rays, taking care to throw a light-coloured cloth over it, to protect it as much as possible from the heat. The mirror is now placed at such a distance from the object-glass as to equally illuminate the field, which, effusing the concave side, I found was best done by allowing a space slightly greater than its focal length to intervene between it and the object, so that the rays should enter the instrument just after they have commenced to disperse; otherwise, if the object was in the focus of the mirror, I observed a bright white spot occupying a portion of the field, which

a few general remarks worthy of consideration when absolutely perfect negatives are desired.

The sliding body of the camera should undoubtedly be lined with black cotton or silk velvet. I prefer the latter, the black dye of silk being more permanent: to the eye of a close observer, the fog produced by diffused light from the surfaces of the usual black stain used for the inside of cameras is very evident. Single lenses, under very many circumstances, should be protected as much as possible from reflected light entering the tube of brass-work, by means of a shade over the upper portion of the tube: this helps to prevent solarization of the sky. The shade need not project beyond 4 inches; a piece of brown paper and string answers the purpose. To prove the necessity for this precaution, focus a landscape, withdraw the ground glass, throw the velvet over your head, and look into the camera. A considerable quantity of light will be perceived on the lower surface of the lens-tube; place a shade over the upper portion of this tube, and the extraneous light will vanish. All rays of light that do not actually emanate from the object to be copied, ought to be dispensed with when brilliancy of image is aimed at.

It cannot be too frequently urged that the velvet cloth must be thrown over the slide when in position, before pulling up the shutter; and also that this should be large enough to extend somewhat over the rigid portion of the camera, in order to prevent light entering the sliding body.

I would remark, in conclusion, that experiments with ordinary double lenses of short focal length and full aperture are comparatively worthless for testing the actual value of photographic preparations or processes; the results obtained on small plates are also not sufficiently conclusive. In order to arrive at a full and satisfactory conclusion, when working either for the purpose of chemical investigation in photography, or with a view to establishing the value of any process, plates not less than 12 × 10 ins. should be used, and a single lens of 20 inches focal length, with not more than half an inch aperture. I have for some time past adopted this course, and have found the indications in every respect more valuable and instructive.

I see in the last Number of your Journal a letter signed "Thomas A. Barber." The writer does me the favour to mention my name three times. I should be much wanting in courtesy were I to omit noticing this distinction; but allow me to state that I have never seen the article referred to in that letter. I do not think there is any necessity for altering either my statements or opinions in reference to this subject.

RICHARD W. THOMAS.

Alcoholic Collodion.

To the Editor of the Photographic Journal.

SIR,—It is now upwards of four months since I sent an article to the then Editor of the Journal, detailing the advantages, from practical experience extending over many months, and which had been verified by some of our first-rate professional artists, of collodion made with pyroxyline at a low temperature, and without excess of sulphuric acid, and containing an extra large amount of alcohol, over collodion made with pyroxyline at a moderately high temperature, with excess of sulphuric acid, and with the ordinary proportions of ether and alcohol. I find that, owing to the delay of publication, or possibly the consignment to the waste-basket of so novel an idea, another gentleman has, without having heard of my experiments, brought forward and published a similar idea, and claims exactly the same advantages which I also stated, thus doing me out of priority of publication. The advantages which I claimed were the following:—

1st. The collodion runs in a smooth glassy film, sticks tight to the glass, and allows plenty of time in the hottest weather before putting in the bath.

2ndly. The collodion gives very great intensity, and at the same time keeps a much longer time, from the low temperature of the pyroxyline, than collodions made the contrary way.

3rdly. It iodizes very rapidly in the bath, two minutes being sufficient instead of ten, and becomes perfectly wetted from the mixing of the alcohol and water.

4thly. The bath keeps a much longer time, as the accumulation of ether causes it to give running lines to the film in the direction of the dip.

5thly. The developer requires no alcohol to cause it to mix with the nitrate of silver; on the film there is no chance of staining in development; no curtains are seen at the depending end of the plate; and, although very intense, there is seldom any solarizing of the skies in landscapes.

The following is the receipt I find to answer best. I have not pushed it quite so far as has been stated; but possibly, with great care in the make of the alcohol, the proportions may be so.

Paper pyroxyline made at 130° Fahr., with equal parts of sulphuric and nitric acids, well

washed in many changes of water, and lastly, with two or three changes of *boiling* water:—

Absolute ether	. . .	3½ drachms
Absolute alcohol	. .	2½ drachms
Pyroxyline	. . . .	6 grains

Iodizing Solution.

Iodide of potassium	. .	12 grains
Distilled water	. . .	6 drops
Iodide of cadmium	. .	5 grains
Absolute alcohol	. . .	1 ounce.

2 drachms of iodizing solution to 6 drachms of collodion.

I have used a larger amount of alcohol than the above; but unless it is very strong (really absolute), it will be impossible to dry one end of the plate before the other becomes too dry before dipping in the bath.

FRANCIS G. ELIOT.

PROCESSES.

Honey-Albumen Process.

To the Editor of the Photographic Journal.

Dundee, 30th September, 1858.

SIR,—These Notes are written for the consideration of amateurs. The honey-process, in its simplest form, has been practised successfully in this quarter for some years; but there are certainly drawbacks, from the plates being moist, and from their liability to decomposition not allowing them to be kept with certainty for any length of time. The negatives by that process are, however, of an excellent quality for variety and delicacy of tone.

The late discovery of a simple collodion dry process led to experiment; and a friend and myself appear to have separately proved the complete efficiency of the following method. The pictures accompanying these notes will perhaps allow a correct judgment to be formed, and enable you to give encouragement to those who wish, with comparative facility, to record the beauties of nature's scenery, without the labour and expense of cumbrous apparatus.

The plate is sensitized in the ordinary bath used for negative pictures. It is afterwards drained until the surplus nitrate of silver almost ceases to drop off, and then aided by resting the corner of the plate on blotting-paper. A solution of honey and water is then floated backwards and forwards over the surface for about a minute. The plate is afterwards washed under a gentle tap for a minute or so, and drained for a little. A solution of albumen and water is then floated over the plate for a minute or more, and the surplus dropped off. It is again well washed under a tap, or by a gentle stream of water, for more than a minute. The plate is now to be placed vertically in a dark place on blotting-paper, in order to dry before being put into the slide for exposure.

The honey used ought to have been dripped purely from the comb; and two parts of water, or less, added, according to its consistency, and the solution well shaken and filtered—to be used before becoming acid. It is not necessary to pour on as much of the solution as will at once cover the plate; it is sufficient if, by after-waving, the whole surface is covered.

The albumen, with an addition of one-half or more of its bulk of water, is to be beat up entirely into froth, set aside to fall back, and then filtered through sponge. The albumen is poured on along the edge, and ought at once to flow evenly forward over the whole surface of the plate, by using the proper waving motion. The well washing of the plates before and after pouring on the albumen must be strictly attended to; as the slight washing in dishes, recommended by some, is sure to lead to provoking disappointment, by producing pictures marked and disfigured in various ways.

Experiment must prove the necessary exposure. A single stereoscopic lens by Ross (diameter 1 inch, diaphragm $\frac{3}{16}$ inch, and focus 4½ inches) required six minutes. A single lens by Lerebours (diameter 3 inches, diaphragm ½ inch, and focus 21 inches) required ten minutes. The time must be shortened or extended according to the nature of the subject and light.

The plate is dipped for a few seconds in a bath of water before development, which requires from four to fifteen minutes, according to the time of exposure and the quantity of silver solution (30 grains to the ounce) added to the developer, immediately before pouring it on. Slow development with a smaller quantity of silver secures more delicate pictures. With a proper exposure, a first strong developer will almost complete the negative. The developer is,—pyrogallic acid, 2 grains or more; glacial acetic acid, ½ drachm or less; water, 1 ounce. Fix with hyposulphite of soda.

If there be not time to allow the plates to stand to dry,—and which requires from eight to twelve hours, according to the temperature,—they can, without any danger, be dried by the application of heat. I have frequently rested the plates on tin (but not coming immediately into contact with it, in order to prevent breaking), heated from below by a jet of gas. The plate is protected from reflected light, and dries and hardens in ten to fifteen minutes.

The all-important advantage of adding the honey solution is, to wash away effectually the free nitrate, and especially to secure the delicate half-tones, that cannot be obtained by using albumen alone.

space of this second lens, then throw the rays nearly parallel, and then I could afford to place my object very near to it, which made a very great difference. Having worked in that way, I then found that by using, instead of that bull's-eye lens, a very small lens of a similar form, that is to say, a plano-convex lens of great convexity, I got another advantage; for instead of covering that large surface, I only cover a small surface, and therefore my second lens became much more powerful. That mode of throwing the rays of light nearly parallel, or very slightly converging, will be found to illuminate the object so brilliantly and so perfectly, that the amount of rapidity gained was very great. Now, with regard to the ascertaining the amount of chemical variation, an object mounted in fluid I find to be the simplest mode of detecting that. I recollect working with a parasite of the water-rat. I found the parasite was studded with numerous small hairs. Focusing with one of those, the image showed the hairs; but upon taking the picture, I could not get that which my eye saw in the image; then, by focusing for a more distant object, of course I could get exactly that which I required. I may remark, that the object-glasses of the same maker, although worked from the same tools, and corrected to the same point, apparently do not work absolutely alike; but the amount of correction required for one object-glass is not a criterion for the other. Now, with regard to the object-glasses of Powell and Leland, they are less corrected than either Ross's or Smith and Beck's. I may further remark, with regard to the enlargement of the object by means of the eye-piece, of course, as Mr. Traer has remarked, you do not gain anything in definition, but you must of necessity lose; and it has another inconvenience: as it increases the convexity of the field, the field is not so flat as it is when the eye-piece is not introduced. Some little time ago I was talking to Mr. Ross upon this very subject, and suggesting certain matters, and he told me then that he had had some time in contemplation the construction of an eye-piece expressly for photographic purposes, and it might be constructed so as to correct the amount of variation in the object-glass itself;—that would be a very possible thing. There is one other point which I think Mr. Traer has left a little without explanation: he did not communicate how he focused his objects. If you take the ground-glass of a camera, and attempt to illuminate objects requiring high powers, there are certain fine marks and lines which would be absolutely imperceptible upon the ground-glass in the camera; moreover, you would require the assistance of an eye-piece in order to render them perceptible. Now, the most useful adjunct that I can recommend is a positive eye-piece, the construction of which is very simple. It consists only of two lenses fitted in a tube in *this* way, the focus being as 2 to 3; and they are placed apart in such a distance as to be equal to half the sum of their foci, the peculiar arrangement of which is, that you get a flat field. You can then use this upon the ground-glass of the camera, and you will get the enlargement of the eye-piece to the amount of some 20 or 30 diameters, according to the power of the eye-piece. But it is better than using ground-glass to take a piece of plain glass, coat it with collodion, sensitize it, wash it and dry it, and you will have a most beautiful surface, on which all the most delicate details of an object will be visible.

Mr. Reeves Traer.—I never found any difficulty in focusing. The glass I use is not ground-glass, it is matted glass; and I have always found my object sufficiently defined to enable me to see the marks, with my naked eye, of all the objects I have produced. I have lately been turning my attention to the photography of subjects connected with healthy and diseased states of the human body, such as the urinary deposits. I have always used sunlight, because I fancy you can get much better photographs by sunlight than by artificial light. Getting a photograph in less than a second I always fancied was a great advantage, therefore I never went into the question of artificial light. I have not noticed that the addition of the eye-piece had the effect described. If you look at "*that large picture*," you will not find that there is any great convexity.

Specification of the Patent granted to William Henry Fox Talbot, F.R.S., *of Lacock Abbey, in the County of Wilts, Esquire, for Improvements in the Art of Engraving.*

"The process described in this specification, to which I have given the name of 'Photoglyphic Engraving,' is performed as follows:—

"In this invention I employ plates of steel, copper, or zinc, such as are commonly used by engravers. Before using a plate its surface should be well cleaned; it should then be rubbed with a linen cloth dipped in a mixture of caustic soda and whiting, in order to remove any remaining trace of greasiness. The plate is then to be rubbed dry with another linen cloth. This process is then to be repeated; after which the plate is in general sufficiently clean.

"In order to engrave a plate, I first cover it with a substance which is sensitive to light. This is prepared as follows:—About a quarter of an ounce of gelatine is dissolved in eight or ten ounces of water, by the aid of heat. To this solution is added about one ounce, by measure, of a saturated solution of bichromate of potash in water, and the mixture is strained through a linen cloth. The best sort of gelatine for the purpose is that used by cooks and confectioners, and commonly sold under the name of gelatine. In default of this, isinglass may be used, but it does not answer so well. Some specimens of isinglass have an acidity which slightly corrodes and injures the metal plates. If this accident occurs, ammonia should be added to the mixture, which will be found to correct it. This mixture of gelatine and bichromate of potash keeps good for several months, owing to the antiseptic and preserving power of the bichromate. It remains liquid and ready for use at any time during the summer months; but in cold weather it becomes a jelly, and has to be warmed before using it: it should be kept in a cupboard or dark place. The proportions given above are convenient, but they may be considerably varied without injuring the result. The engraving process should be carried on in a partially darkened room, and is performed as follows:—A little of this prepared gelatine is poured on the plate to be engraved, which is

then held vertical, and the superfluous liquid allowed to drain off at one of the corners of the plate. It is held in a horizontal position over a spirit-lamp, which soon dries the gelatine, which is left as a thin film, of a pale yellow colour, covering the metallic surface, and generally bordered with several narrow bands of prismatic colours. These colours are of use to the operator, by enabling him to judge of the thinness of the film: when it is very thin, the prismatic colours are seen over the whole surface of the plate. Such plates often make excellent engravings; nevertheless, it is perhaps safer to use gelatine films, which are a little thicker. Experience alone can guide the operator to the best result. The object to be engraved is then laid on the metal plate, and screwed down upon it in a photographic copying-frame. Such objects may be either material substances, as lace, the leaves of plants, &c., or they may be engravings, or writings, or photographs, &c. &c. The plate bearing the object upon it is then to be placed in the sunshine, for a space of time varying from one to several minutes, according to circumstances; or else it may be placed in common daylight, but of course for a long time. As in other photographic processes, the judgment of the operator is here called into play, and his experience guides him as to the proper time of exposure to the light. When the frame is withdrawn from the light, and the object removed from the plate, a faint image is seen upon it—the yellow colour of the gelatine having turned brown wherever the light has acted. This process, so far as I have yet described it, is, in all essential respects, identical with that which I described in the specification of my former patent for improvements in engraving, bearing date the 29th October, 1852.

"The novelty of the present invention consists in the improved method by which the photographic image, obtained in the manner above described, is engraved upon the metal plate. The first of these improvements is as follows:—I formerly supposed that it was necessary to wash the plate, bearing the photographic image in water, or in a mixture of water and alcohol, which dissolves only those portions of the gelatine on which the light has not acted: and I believe that all other persons who have employed this method of engraving, by means of gelatine and bichromate of potash, have followed the same method, viz. that of washing the photographic image. But however carefully this process is conducted, it is frequently found, when the plate is again dry, that a slight disturbance of the image has occurred, which, of course, is injurious to the beauty of the result; and I have now ascertained that it is not at all necessary to wash the photographic image; on the contrary, much more beautiful engravings are obtained upon plates which have not been washed, because the more delicate lines and details of the picture have not been at all disturbed. The process which I now employ is as follows:—When the plate bearing the photographic image is removed from the copying-frame, I spread over its surface, carefully and very evenly, a little finely-powdered gum copal (in default of which common resin may be employed). It is much easier to spread this resinous powder evenly upon the surface of the gelatine than it is to do so upon the naked surface of a metal plate. The chief error the operator has to guard against is that of putting on too much of the powder: the best results are obtained by using a very thin layer of it, provided it is uniformly distributed. If too much of the powder is laid on, it impedes the action of the etching liquid. When the plate has been thus very thinly powdered with copal, it is held horizontally over a spirit-lamp in order to melt the copal: this requires a considerable heat. It might be supposed that this heating of the plate, after the formation of a delicate photographic image upon it, would disturb and injure that image; but it has no such effect. The melting of the copal is known by the change of colour. The plate should then be withdrawn from the lamp and suffered to cool. This process may be called the laying an aquatint ground upon the gelatine, and I believe it to be a new process. In the common mode of laying an aquatint ground, the resinous particles are laid upon the naked surface of the metal, before the engraving is commenced. The gelatine being thus covered with a layer of copal, disseminated uniformly and in minute particles, the etching liquid is to be poured on. This is prepared as follows:—Muriatic acid, otherwise called hydrochloric acid, is saturated with peroxide of iron, as much as it will dissolve with the aid of heat. After straining the solution, to remove impurities, it is evaporated till it is considerably reduced in volume, and is then poured off into bottles of a convenient capacity: as it cools it solidifies into a brown semi-crystalline mass. The bottles are then well corked up, and kept for use. I shall call this preparation of iron by the name of perchloride of iron in the present specification, as I believe it to be identical with the substance described by chemical authors under that name—for example, see Turner's 'Chemistry,' fifth edition, p. 537; and by others called permuriate of iron—for example, see Brande's 'Manual of Chemistry,' second edition, vol. ii. p. 117.

"It is a substance very attractive of moisture. When a little of it is taken from a bottle,

n the form of a dry powder, and laid upon a plate, it quickly deliquesces, absorbing the atmospheric moisture. In solution in water, it forms a yellow liquid in small thicknesses, but chestnut-brown in greater thicknesses. In order to render its mode of action in photographic engraving more intelligible, I will first state, that it can be very usefully employed in common etching; that is to say, that if a plate of copper, steel, or zinc is covered with an etching ground, and lines are traced on it with a needle's point, so as to form any artistic subject, then, if the solution of perchloride of iron is poured on, it quickly effects an etching, and does this without disengaging bubbles of gas, or causing any smell; for which reason it is much more convenient to use than aquafortis, and also because it does not injure the operator's hands or his clothes if spilt upon them. It may be employed of various strengths for common etching, but requires peculiar management for photoglyphic engraving; and as the success of that mode of engraving chiefly turns upon this point, it should be well attended to.

"Water dissolves an extraordinary quantity of perchloride of iron, sometimes evolving much heat during the solution. I find that the following is a convenient way of proceeding:—

"A bottle (No. 1) is filled with a saturated solution of perchloride of iron in water.

"A bottle (No. 2) with a mixture, consisting of five or six parts of the saturated solution and one part of water.

"And a bottle (No. 3) with a weaker liquid, consisting of equal parts of water and the saturated solution. Before attempting an engraving of importance, it is almost essential to make preliminary trials, in order to ascertain that these liquids are of the proper strengths. These trials I shall therefore now proceed to point out. I have already explained how the photographic image is made on the surface of the gelatine, and covered with a thin layer of powdered copal or resin, which is then melted by holding the plate over a lamp. When the plate has become perfectly cold, it is ready for the etching process, which is performed as follows:—A small quantity of the solution in bottle No. 2, viz. that consisting of five or six parts of saturated solution to one of water, is poured upon the plate, and spread with a camel-hair brush evenly all over it. It is not necessary to make a wall of wax round the plate, because the quantity of liquid employed is so small that it has no tendency to run off the plate. The liquid penetrates the gelatine wherever the light has not acted on it, but refuses to penetrate those parts upon which the light has sufficiently acted. It is upon this remarkable fact that the art of photoglyphic engraving is mainly founded. In about a minute the etching is seen to begin, which is known by the parts etched turning dark brown or black, and then it spreads over the whole plate—the details of the picture appearing with great rapidity in every quarter of it. It is not desirable that this rapidity should be too great, for, in that case, it is necessary to stop the process before the etching has acquired sufficient depth (which requires an action of some minutes' duration). If, therefore, the etching, on trial, is found to proceed too rapidly, the strength of the liquid in bottle No. 2 must be altered (by adding some of the saturated solution to it), before it is employed for another engraving; but if, on the contrary, the etching fails to occur after the lapse of some minutes, or if it begins, but proceeds too slowly, this is a sign that the liquid in bottle No. 2 is too strong, and too nearly approaching saturation. To correct this, a little water must be added to it before it is employed for another engraving. But in doing this, the operator must take notice, that a very minute quantity of water added often makes a great difference, and causes the liquid to etch very rapidly. He will therefore be careful in adding water, not to do so too freely. When the proper strength of the solution in bottle No. 2 has thus been adjusted, which generally requires three or four experimental trials, it can be employed with security. Supposing, then, that it has been ascertained to be of the right strength, the etching is commenced as above mentioned, and proceeds till all the details of the picture have become visible, and present a satisfactory appearance to the eye of the operator, which generally occurs in two or three minutes; the operator stirring the liquid all the time with a camel-hair brush, and thus slightly rubbing the surface of the gelatine, which has a good effect. When it seems likely that the etching will improve no further, it must be stopped. This is done by wiping off the liquid with cotton-wool, and then rapidly pouring a stream of cold water over the plate, which carries off all the remainder of it. The plate is then wiped with a clean linen cloth, and then rubbed with soft whiting and water to remove the gelatine. The etching is then found to be completed.

"I will now describe another etching process, very slightly differing from the former, which I often use. When the plate is ready for etching, pour upon it a small quantity of the liquid No. 1 (the saturated solution). This should be allowed to rest upon the plate one or two minutes. It has no very apparent effect, but it acts usefully in hardening the gelatine. It

is then poured off from the plate, and a sufficient quantity of solution No. 2 is poured on. This affects the etching in the manner before described; and, if this appears quite satisfactory, nothing further is required to be done. But it often happens that certain faint portions of the engraving—such as distant mountains or buildings in a landscape—refuse to appear; and as the engraving would be imperfect without them, I recommend the operator, in that case, to take some of the weak liquid No. 3 in a little saucer, and, without pouring off the liquid No. 2, which is etching the picture, to touch with a camel-hair brush, dipped in liquid No. 3, those points of the picture where he wishes for an increased effect. This simple process often causes the wished-for details to appear, and that, sometimes, with great rapidity, so that caution is required in the operator, in using this weak solution No. 3 especially, lest the etching liquid should penetrate to the parts which ought to remain white; but in skilful hands its employment cannot fail to be advantageous, for it brings out soft and faint shadings which improve the engraving, and which would otherwise probably be lost. Experience is requisite in this, as in most other delicate operations connected with photography; but I have endeavoured clearly to explain the leading principles of this new process of engraving, according to the method I have hitherto found the most successful.

"With respect to the second invention mentioned in my provisional specification, in which the electrotype process is employed, I have found that it gives less successful results than that which I have fully described above, and I have therefore omitted it from this specification, and make no claim with respect to it.

"In conclusion, I would remark that, besides the process of photographic engraving considered as a whole being new, I believe the following points also to be new, viz.—

"First, the etching a photographic image formed upon a surface of gelatine and bichromate of potash, without first disturbing that surface by washing it with water or alcohol.

"Second, the laying an aquatint ground of resin or copal upon a surface of gelatine, and not, as usual, upon the naked metallic surface of the plate.

"Third, after forming a photographic image on gelatine, the heating it strongly over a spirit-lamp or otherwise.

"Fourth, the use and employment of perchloride of iron as an etching liquid for the production of protographic engravings.

"Fifth, the use and employment of the same as a substitute for aquafortis in common etching."

OPTICS.

Two main points in Photography.

By Herr Paul Pretsch.

[Concluded from page 43.]

1. *The Camera Obscura—a scientific instrument.*

Science is more intimately connected with life than we generally suppose. We do not like to devote our exertions and researches to anything which is not wanted in life. Life fructifies science, and *vice versâ*. Therefore almost every scientific discovery is influenced by the wants of the time. We can consequently with confidence state that it would have been of no use at all to invent a perfect camera-obscura lens before Daguerre's discovery; it would have been considered only a curiosity in optics.

The camera-obscura lens at present in general use bears also the stamp of the moment in which it has been originated; and the amount of its capabilities corresponds to the desiderata of that time.

It was also constructed at the time when we knew only Daguerreotype productions on silvered metallic plates. The exposure required half-an-hour, and more. Animated objects, like human beings, could only be taken during the insolation of half-an-hour—leaning, lying, or sitting with shut eyes. And still there was the strong desire of taking portraits by the then new method. Moreover, there was an earnest desire to examine the pictures by microscopes; therefore the want was felt to produce a new camera-obscura lens of a far greater intensity of light and much-increased sharpness of picture.

Prof. Petzval succeeded, after long exertions, in establishing the theory of those optical formations; and he began the calculation of such a lens on the following principles, viz.:

Increase of light can be obtained only by two means, viz. 1st, by enlarged aperture; and 2nd, by diminished focal length, or, what is the same, by a smaller size of the picture. Both conditions are obtained by the use of two or more lenses instead of one, and bringing them as near as possible together. But here appears the theory stating that we cannot obtain a better picture by any system of lenses, placed each on another, be they ever so many,—only one case excepted, viz. if all the lenses together act like a plane glass, that is to say, if we will produce a very large picture at a very long distance. Therefore he was obliged to separate the lenses; and the distance proved necessary was one-third of the focus of the anterior lens. In consequence of this he was compelled to make both lenses achromatic; otherwise he

would not have satisfied the two conditions of a perfect achromatism. They are, all the variously-coloured pictures ought to be represented in one and the same place, and of the same size. The accomplishment of eight conditions necessitated eight different optical elements, viz. seven surfaces of lens, and one distance. This arrangement permitted the two constituent parts of the first achromatic lens to have one common surface, and to be cemented together. But the two constituent parts of the second lens had to remain separate, for the purpose of obtaining the four remaining surfaces, although this caused some loss of light.

Having achieved these points by calculation, the lens was executed, according to the instructions of Prof. Petzval, by Mr. Voigtlander; and the result proved so far successful that portraits were taken in direct light of the sun in 40 seconds. The lens has been discussed and criticized; properties have been ascribed to it which it did not possess, and properties denied which it did possess. However, a clear explanation of its capabilities has never been published.

In fact, this lens had an aperture of 1½ in., with a focus of 5½ ins., and allowed, under favourable circumstances, an enlarging of 20 times. This always appeared to me too great a sacrifice made to the fancy views of the public, and a disagreeable precedent, which, however, possesses a double advantage, viz. 1st, we possess something to make a sacrifice with, and even a less careful execution is able to produce something useful; and 2nd, the camera-obscura lens becomes a valuable optical instrument, for its sharpness and clear definition. This sharpness, and the great intensity of light—16 times more than Daguerre's first lens—have been the main points pursued, and gained too, by theory.

But, as mentioned before, there is nothing for nothing; and every acquisition must be paid for by proportionable sacrifices. The application of two separated lenses causes two disadvantages—the reproduction of the picture in a curve, and a limited field of view.

In the lenses executed at a later time, but on the same principle, and double the size, the curvature became one of a radius of 15 inches. Although there are some means left to bring the picture nearer to an even surface, nevertheless it was considered sufficient, and more so as it was destined mainly for taking portraits; and the picture of a person to be taken being nearer to a curve than to a plane surface, the photographer can obtain, by a reasonable arrangement of his original, a pretty good picture.

The inequality of illumination of the picture of this lens, though not so important in portraits, would render it almost unfit for taking views, especially with full aperture, if we were not enabled by a diaphragm to distribute the light more equally, to diminish the unequal distances of the objects in the picture, and to moderate the curvature of the picture itself. The best place for a diaphragm in such a combination of lenses—if the apertures are about equal—is in the middle, between the two achromatic lenses. *In this way we can obtain a picture which generally surpasses a picture taken by one of the best single achromatic lenses.*

But the increased wishes of the public have caused some opticians to go still farther. They have the lens, originally calculated for 1½ inch aperture, constructed of three and four times the original size, with 4 and 5 inches aperture. The practical optician has done this arbitrarily, without the assistance of science, and has neglected to consider that, in such an instance, the radii of curvatures require a certain correction for the purpose of preserving the same superiority of the picture.

Considering all these circumstances, Prof. Petzval thought the time had arrived for the issue of a new camera-obscura lens, which should not replace the former, originally constructed for taking portraits, but which should render valuable services in many cases where the other is insufficient.

The conditions, stipulated by himself, are—

1st. The intensity of light, or strength of illumination, ought not to be too great, because it would limit the size of the picture, and would increase the influence of unequal distances of the objects on the sharpness of the picture.

2nd. More important is the field of view, which ought to be as large as possible, and equal in distribution of light and sharpness.

3rd. The utmost sharpness ought to be preserved, at least in those lenses whose pictures are subject to examination by microscopes—for instance, the diminished copies of maps, &c.

4th. The objects to be taken are very seldom on a plane, but generally on a curved surface, which turns its concavity to the apparatus. Therefore we do not want a lens which makes an even copy of an even object, because it would make a curved picture of a curved object; but we want a lens with the slightest curvature of the picture—a lens which will reproduce an even picture from a curved original, or from objects suitably placed.

5th. All this ought to be achieved with the smallest expense in glass, therefore by moderate aperture of the lens, for the purpose of becoming enabled (if it is required) to construct the same lens in a larger measurement for the

production of pictures of any size, only limited by the size of the camera obscura, and by the size of the plates to be handled by the manipulator.

These problems are solved by an essential alteration in the construction of the lens. The two achromatic constituent lenses are still remaining for the sake of perfect achromatism; but they are nearer to each other. This was necessary for the purpose of obviating the inequality of illumination, and for the production of a picture equally illuminated in the centre, as well as in the corners and edges. Besides this, it was considered advisable to make the sacrifice of a small part of the aperture for a purpose which has been explained in No. 65 of this Journal.

Here is the description of the lens. It consists, as mentioned before, of two achromatic lenses. The first, whose constituent parts are cemented together, is nearly plano-convex, the convex side turned to the object. The second is placed at a distance from the first, of about one-sixteenth of the focal length of the first. Its first constituent lens is bi-concave, the slighter curvature turned to the object, the stronger one to the picture; the second constituent lens is concavo-convex, the concavity turned to the object, the convexity to the picture.

The advantages which this lens possesses are founded on the principles of sound theory. They are—

1st. *A perfectly correct perspective.* Straight lines will remain so, and will not become crooked. It has been mentioned, in one of the papers about photography, that the lines become "knock-kneed;" but this defect has been experienced not by the use of a Petzval lens, but of an imitation of one which had a considerable spherical aberration.

2nd. *Considerable sharpness of the picture.* As an illustration of this, Prof. Petzval has constructed a telescope whose object-glass consists of this new combination of lenses. He has two of these telescopes, one with 3, the other with 5 inches diameter, to which is added a terrestrial eye-piece. The first allows a magnifying power of 40 times, the other of 80 times, therefore about as much as we demand from the best telescopes of the given proportions of aperture.

But, to speak with numerical accuracy, the picture of this combination, being carefully rectified, is so sharp that it can be examined by a microscope of $\frac{4}{5}$ inch focus, or it allows the application of a magnifying power of 12 times. If this should be considered a surplus, we ought to consider—

a. The full extent of this sharpness is quite available only in the centre of the field of view, and decreases a little to the edges of the picture.

b. It was my aim to make this lens also available for copying maps to the fifth part of their scale, and even in such a manner that, by copying, nothing be lost of the details of the original, in so far that we are able to observe in the copy distinctly all the contents of the original by means of a microscope of 5 times magnifying power, or almost 2 inches focus.

c. In using an instrument for photography, there is generally something lost; therefore we must possess some surplus for the purpose of being able to sacrifice something.

3rd. A further quality of the new combination of lenses is the *equal strength of light* from the centre to the utmost corners of a surface of 16 × 14 inches, or of a circle of 20 inches diameter; it offers, therefore, an equally illuminated field of view of 42 degrees. If we compare the same in this respect with the combination for portraits, we shall find a superiority of 1 : 10, because the picture of the portrait-lens has only a round spot in the centre, of about a little more than 2 inches diameter, where the light is quite full and equal; from there to 6 inches the strength of the light decreases to half of its maximum value, and passes from thence very quickly to 0.

The curvature of the picture of this lens is a slight one; it has a radius of 80 inches. To go still further would not have been advisable. This curvature remains constantly the same, whatever the distance of the object from the lens may be.

The chromatic properties of a lens vary according to the use for which it is intended. Therefore a lens which might give a brilliant picture in a telescope, will most probably reproduce by photography a picture less sharp, because the visual focus is here predominating. The extreme in the contrary direction would also furnish a difference between the visual and chemical focus. But we can—by keeping in view the whole spectrum, and not only one end of it—combine pretty nearly the most effective pencils of rays of the one description with the others. Therefore such a lens will be, in fact, neither the best lens for visual, nor for photographic purposes; but this will be not detrimental if the lens possesses an excess of sharpness. Professor Petzval prefers the last sort of achromatism, and states that the difference of the two foci in his lens of 3-inch aperture and 26-inch focus might be not quite $\frac{1}{24}$th of an inch, that is to say, at the one end of this very short space are united the pencils of rays belonging to the centre of the spectrum, and at the other end the extreme

red and violet pencils of rays; between the two is the chemical as well as the visual focus. The separation of the two can only be $\frac{1}{96}$th of an inch, and is therefore only perceivable by very fine experiments, perhaps by the use of this instrument for enlarging photographic pictures to a considerable size. However, all this is stated only for the human eye in its normal state; there might be some who are not equally sensitive to variously coloured light.

The troubles in photography which are inseparably connected with the production of large pictures are numerous. We will not speak here of the washing-dishes, baths, vessels, and other utensils; but it must be observed that a lens with a long focus is sensible to unequal distances in the quadrature of the proportion of the foci; namely, a lens with 26 inches focus in comparison with a similar one of 11 inches, supposing the quantity of light to be the same, will show this difference, in case of an irregular position, five times more. It was therefore considered necessary to alter the camera; and here is a field for anybody who likes to make improvements,—but not in the lens: there is *no improvement* to be made, not even by the theory of profound science, because it is the best one which can be achieved by the expenditure of the mentioned optical means.

This alteration, or addition, consists chiefly in a "swinging back," for the purpose of inclining the ground-glass, and also the surface, on which the picture ought to be taken. At a short focus, and in a small field of view, such a contrivance is not so necessary; but it is indispensable at this new lens. It is very frequently the case, that the objects to be taken are situated at various distances from the camera. There is a row of houses, the nearest point of which is about some twenty yards, the other end a great distance off. According to the laws of nature, and there is no protest against them, the distances of union of the pencils of rays emanating from these objects differ more or less considerably, in proportion to the length of the focus. In the given instance this difference will be 1 inch; and if the nearest objects are at a distance of about fifteen yards, the difference will be about 2 inches. This perceptibility for the difference of distances compels us to use all the means of remedy for it.

If the position of the camera is well chosen, the objects in near distances appear either on one side, for instance on the right, and the camera will require therefore a greater length on the left-hand side; or the near objects are in the foreground, and require therefore a longer distance from the lens on the upper part of the camera. The "swinging back" ought to have consequently a double movement, one on its vertical, and one on its horizontal axis. An inclination, for the purpose of shortening the upper part of the camera, will be very seldom required; however, it ought to be in existence, for instance in the case, if we are to take the interior of a building, and we are obliged to take also the cupula, or the ceiling of the hall.

But in spite of all these contrivances, of making effective all the good properties of the lens, an inventive photographer may still find out means enough to take an unsharp picture by a sharp apparatus, to make strength of light useless, and to do away with the correctness of perspective, &c. There are some rules for this purpose, viz.:—

If we will take an unsharp picture, we have only to place the camera near a very thick tree, bringing it in the centre of the picture, and we shall obtain either a washed-out tree in a sharp landscape, or a washed-out landscape and a sharp tree.

If we will do away with the correctness of perspective, we have only to choose an edifice with two high towers or steeples, and place the apparatus very near to them, if possible in an oblique position, and we shall have the satisfaction of seeing how steeples can bow. In taking portraits, such an inventive genius can do wonders; he can change a very nice person into a monster, or change a straight sword into a sabre; and in taking groups of persons, a little man can be made a giant.

Swift has explained the art of making a bad poem; and it would be perhaps a task not without merit to develope all the tricks of a bad photographer. However, a very ingenious trick might here be mentioned, by which any operator, in spite of all the exertions of the optician, of the chemist, and of himself, can obtain spots instead of a picture. It needs only to place a piece of white paper before the surface destined to receive the picture. This will produce false light, and is more effective than a hole in the bellows of the camera. A black, but shining and glossy surface, answers for a similar purpose, but not so well.

In tactics we possess certain rules for the battle-array of the various troops,—not for the purpose of adhering strictly and only to these rules, but for the purpose of giving a general view of the advantages which might be gained by a certain arrangement. Every photographic apparatus possesses also its tactical rules, namely, the position of the objects to be taken; in fact, such a position as is capable of rendering an equally sharp picture

on a flat surface placed vertically to the axis of the instrument. It is desirable to understand this position.

If the objects in the centre of a picture are to be seen at a very long distance, but if there are on the sides, or in the foreground, objects situated nearer, perhaps at a distance of 80 or 100 steps, we obtain an equally sharp and flat picture.

The best mode of taking groups of persons is to place them in the periphery of a circle which is made by the radius of 7 feet from any point of the axis of the instrument. The more we deviate from it, the more we shall be troubled by the unsharp parts of the picture, and the more necessary will become an inclination of the surface of the image to the axis of the instrument.

But it is not intended to say that we can take a picture only in this position; this rule ought to be applied for instance in this way:—The photographer going to take a view, tries whether he can find out a spot from which the objects to be taken are seen in the above-mentioned position. Has he found such a spot? then he can take a picture on a surface vertical to the axis of the instrument, and can do it without a diaphragm. If no such spot can be found, then he ought to ascertain whether he can obtain the desired effect by moving the axis of the instrument, in which case he can obtain, by a corresponding movement of the surface of the image, a sharp picture without a diaphragm. The same mode can be applied if we are going to take objects at near distances—objects which we can place, if we choose, at the required distance from the instrument. But if we are obliged to take objects in unfavourable positions, perhaps in a contrary position to that required—near and far objects on the same place, or near to each other—in this case we can only obtain a good picture by using a smaller or larger diaphragm, and allowing a longer time for exposure.

The human eye is also a camera obscura, but a very little one. The limits of its efficiency are from 8 inches to an indefinite distance. A lens of 11 inches focus will reach from 20 steps to the indefinite; a lens of 26 inches focus from 120 steps to the indefinite; and if we were to construct an instrument of still greater dimensions, perhaps of 52 inches focus, we should be enabled to take, without a diaphragm, pictures of objects whose distance from the instrument is from 500 steps to the indefinite.

It has been mentioned already that this lens is especially fit for taking maps in a smaller size than the original. Copies of maps ought to be reproduced with mathematical accuracy, preserving all the details of the large original exactly, and allowing the use of a microscope. Prof. Petzval explains for this purpose some contrivance how to arrange the original, which ought to be placed in the inner surface of a paraboloid of rotation. The use of diaphragms is here limited, because, if stops of too small an aperture be applied, some of the lines become indistinct. A well-executed copy of a map is a test of the superiority of a lens, of the chemicals, and of the photographer.

The accuracy of this objective or lens, required for the last-mentioned kind of work, enables us to make use of it also for copying originals in the same size, and for enlarging them. The effect of the instrument is chiefly calculated for great distances; and it is therefore not quite in the right place if it be used for copying in the same dimensions as the original. In such a case, as a matter of necessity, double the length of the original focus for direct rays would be required.

If it is used for magnifying purposes, picture and object ought to exchange places. The object or the original ought to be placed on the side of the smaller lens, and the picture produced on the side of the larger lens. Very fine and sharp negatives on glass can be copied in an enlarged dimension with great advantage. But in this case the paper for the positive copy of the picture ought to possess the form of the paraboloid of rotation mentioned before. Experience must teach us in this instance; but we may state that, if thirty seconds be necessary for taking a copy five times smaller than the original, we may take a copy five times larger than the original in about ten minutes, having only twenty-five times inferior strength of light. However, this is only if we take the enlarged copy in the same light as the diminished copy—for instance, opposite a white wall, or a clear skylight. But if we can apply a heliostat with an illuminating lens, we can increase the strength of light to an important degree, and shorten, therefore, the time of exposure.

These remarks have been abridged from the observations of Prof. Petzval on the production of his new lens. They are made for the purpose of facilitating the study of his instrument. I thought it advisable to omit all mathematical formulæ. I can only add that I should have preferred to see Prof. Petzval's own report published in English, arranged by a man who is more conversant with the language, and even with strict science itself. Should anybody of more learning and abilities be inclined to enter upon this task, I should be most happy to furnish him with every assistance in my power.

A vote of thanks was accorded to Mr. Pretsch.

PHOTOGRAPHIC CHEMISTRY.

Nitrate of Silver.

To the Editor of the Photographic Journal.

Dublin, October 13, 1858.
64 Blessington Street.

SIR,—In former Numbers I have alluded to several causes of failures in the collodion process, and I have lately discovered that which is no doubt the cause of some of the impurities in nitrate of silver.

Old baths are frequently, when hopelessly spoiled, turned to account to a very large extent by precipitating the chloride and converting it into metallic silver; and I have no doubt the process of reduction recommended in the Appendix to Mr. Hardwich's work is often employed. I allude to the process of reduction by means of dilute sulphuric acid and metallic zinc.

I carefully followed Mr. Hardwich's directions, but the result was a total failure, although I have succeeded in making the purest nitrate from pure silver.

Investigation of the causes of failure proved that there was in the zinc of commerce some metallic impurity, which was almost wholly insoluble in sulphuric acid, either concentrated or diluted; this impurity, on the subsequent conversion into nitrate, dissolves with the silver, and contaminates the entire mass.

I separated a portion of this impurity, and performed a few experiments with it, of which the following is a sketch:—

It is but slightly acted on by sulphuric acid, either concentrated or dilute.

It is not acted on visibly by caustic alkalies, ammonia, cyanide of potassium, or glacial acetic acid.

It is readily soluble with disengagement of gas in hydrochloric acid, and there is little or no deposit.

It is soluble to a great extent with slight residue in nitric acid, with the production of a muddy liquid.

Heated in a glass tube it refuses to sublime, and fuses under the blowpipe to a yellow mass.

I enclose a small portion, on which Mr. Hardwich may experiment further if he thinks it worth his while.

My experiments prove that it is neither arsenic, silver, nor pure zinc, and establish beyond doubt that Mr. Hardwich's instructions in his Appendix require revision.

W. M. MACARTNEY.

Further analysis.

Addition of NH_4O to the solution in HC produces a white flocculent deposit, insoluble when NH_4O is added in excess. This deposit is partially soluble in SO_3, the solution being opalescent. Addition of NH_4O again throws down the white precipitate with a slight evolution of a gas, and this precipitate is not wholly soluble in HCl.

The gas generated by the action of HCl on the substance, does not produce any visible effect on a strip of bibulous paper wetted with a solution of $PbO, C_4H_3O_3 + 3HO$.

Silver reduced from the chloride by the action of the zinc and SO_3 was agitated for upwards of twelve hours with SO_3, washed repeatedly with hot and cold water (rain) until no deposit was produced by $BaCl + 2HO$. This was again agitated for twenty-four hours with HCl, and washed with rain-water until the water produced no effect on blue litmus paper. The silver thus purified was again agitated for above twelve hours in solution of $NaO,S_2O_2 + 5HO$, and washed until there appeared to be no trace of the hypo, yet the silver thus purified, when acted on by NO_5, leaves a slight amount of a yellowish residue. I enclose a small sample of the silver.

Mr. Hardwich's Reply to Dr. Macartney.

THE samples sent were so small that no satisfactory experiments could be made with them. Dr. Macartney, however, may be assured that the process described is really one of the best known. It is extensively used in recovering metallic silver from the waste assay liquors, and Mr. Hardwich is credibly informed that in some instances the silver so obtained has proved to be *absolute*. Those who know the wonderful accuracy of the assay process will understand the value of any recommendation proceeding from that source.

Metallic zinc contains *carbon* almost invariably, and this is left behind in the form of black flakes when the zinc is acted on by dilute sulphuric acid. The old nitrate baths abound usually in organic matter, much of which is carried down with the silver precipitated by zinc. Hence if the silver be not *melted* before treating it with nitric acid, oxidation and contamination of the nitrate with organic products will result. Dr. Macartney has rendered a service by calling attention to the presence of impurities; but the fault cannot be laid upon the process, which has been proved to be sufficient under ordinary circumstances.

The black powder left behind on dissolving zinc in dilute sulphuric acid, may contain, besides carbon, sulphide of lead, tin, and iron. The quantity of black residue varies with different samples of zinc.

THE LEEDS MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

On Nitro-Glycerine. By Dr. J. B. Edwards.

The author referred to the physiological effects of this substance, and in his inquiries relative to it had proposed to himself the question,—"Did it or did it not possess poisonous qualities?" With this object he had been led to experimentalize on various animals whose digestive organs differed very widely, and in every case he had found that it was highly poisonous. In the case of man, also, a few drops acted very powerfully in causing headache, and the symptoms produced were very similar to those caused by the administration of strychnia,—a fact which rendered further and full inquiry very important. Dr. Edwards had also experimented upon a group of xyloid substances of various origin, such as those produced by the action of nitric acid upon starch and sugar, and the results appeared to show that they differed materially from nitro-glycerine in not being possessed of such pernicious properties.

On the Dry Collodion Processes. By W. Sykes Ward, Esq.

The author observed that some apology was due from him for occupying the time of the Section with this subject, as he had already introduced it at Cheltenham, and again last year at Dublin; but in the dry process he thought there was more scope for investigation than in any other department of photography, and he mentioned the continued researches and experiments of both French and English photographers on the subject, a result of which being that they had a vast number of different processes published—so many, indeed, that they were likely to create some confusion. There was, however, an advantage in their variety, as most of them were capable of modification and interchangeability, so that an operator might adapt each to his own particular requirements. It had been objected to the use of many of the methods proposed that they required so much manipulation; but, in his opinion, the great thing to be aimed at was a superior result, and certainly he was no true artist who objected to one or two more operations, provided a successful result were attained. Indeed, many of the operations were more for the purpose of correcting errors or removing stains than necessary parts of the process. He then detailed a variety of the dry processes, referring in terms of high eulogy to that proposed by Mr. Maxwell Lyte, in which a film of metagelatine is used. This process, he thought, had not obtained the notice of which it was well worthy. It had been urged that the dry process had mostly failed in the production of views of the foliage of trees and of water in motion; but in this respect Mr. Lyte's process was singularly successful. He might state, in conclusion, that none of the dry collodion processes that had come under his notice were so sensitive as they were represented to be, although that was a matter of minor importance as it regarded small pictures, especially such as were used for the stereoscope; yet it was of much consequence in larger pictures.

On a Process for the Estimation of Actinism. By Mr. R. J. Fowler.

The author said that, in drawing the attention of the Section to the estimation of the actinic force of the solar radiations, his object was rather to add what he presumed were new facts to the science of actinometry, than to present a perfect and complete process in every respect. In the ninth volume of Gmelin's 'Handbook of Chemistry,' he found it stated that "oxalate of ammonia mixed with aqueous protochloride of mercury is decomposed under the influence of light, yielding sal-ammoniac, calomel, and carbonic acid;" it also stated that "the mixture of the two solutions remains clear in the dark, in daylight it becomes turbid in six minutes, and in the course of an hour deposits calomel, which in sunshine quickly falls down in soft flakes, surrounded with bubbles of carbonic acid. The filtrate no longer contains mercury, but chloride of ammonia and undecomposed oxalate of ammonia." On seeing this he was at once struck with the idea that here might be the elements of a process for actinometry, and whether this was the fact he left them to judge from the experiments he had tried on the subject. He found it true that the solutions named might be kept unchanged for an indefinite period in the dark; that the calomel began to precipitate in from 15 to 20 seconds in full sunshine; and also that the precipitate ceased immediately the vessel containing the solution was removed from solar influence, thus showing that the action is not continued in darkness, even when the change has been partially effected, and that the action of the actinism is not in this case catalytic. He had also exposed three tubes containing the mixed solutions to pretty uniform light: No. 1 for ten minutes; No. 2 twenty minutes; No. 3 forty minutes; the results being that No. 2 contained twice the bulk of precipitate of No. 1, and No. 3 twice the bulk of No. 2. When the solutions were exposed several hours, the vessel containing them was found to be completely filled with a magma of the precipitated calomel. From these experiments it appears conclusive that the mixture of solutions of oxalate of ammonia and protochloride of mercury is very sensitive to light; and as this action of light is not catalytic, the precipitate obtained may be considered as produced by solar influence alone, and, lastly, that a definite amount of precipitate is produced by a definite amount of actinic force, thus proving that there are elements of certainty and uniformity in the behaviour of the mixed solutions when exposed to solar influence, from which a certain method for estimating the actinic force may be formed. If extreme delicacy were required in the estimations, the precipitate might be collected, dried, and weighed; but, where this was unnecessary, graduated tubes might be used for exposing the mixed solutions, and from which, after standing a certain time in the dark, the amount could at once be read off. Mr. Fowler stated that in his experiments he had used a nearly saturated solution of the two

salts, but this was by no means necessary, as he found that, if a drop of the solution of protochloride of mercury, containing only $\frac{1}{1800}$th part of a grain of that salt, were added to 300 grains of the solution of oxalate of ammonia and exposed to the light, the calomel would still be precipitated,—the reaction in fact being so delicate that it might be used as a confirmatory test for the presence of the protochloride of mercury. He stated, in conclusion, that it would be interesting to know how the absorbed actinism of M. Niépce de St. Victor would affect the solutions. He had made some experiments in that direction, but not with sufficient success to warrant any positive assertions.

At the close of Mr. Fowler's paper, no immediate remarks being made on the subject, Mr. Mercer, F.R.S., exhibited several specimens of Chromatic Photographs, some being on calico or a similar fabric, produced by previously soaking the material employed in a solution of peroxalate of iron; the effects produced were both singular and novel, and the method promises to lead to photographic colour-printing; it is at least a step in that direction. As the photographs were being handed round for examination, Mr. Mercer gave a few brief explanations of the circumstances that led to their production.

On the Choice of Subject in Photography, and the Adaptation of different Processes. By W. Lyndon Smith.

The author said it was the grand reproach thrown against photography that it was a merely mechanical operation, and that its votaries need not necessarily possess taste, imagination, or even a knowledge of the rudimentary elements of pictorial art. A writer in the last Number of the 'Art Journal' states that his object is to show that no mechanical process can long supersede the living agency of man's mind, and that photography is, and never can be anything more than, a servant of servants; and the writer proceeds, in a long and tedious exposition, to prove by arguments neither novel nor ingenious, the utter inadequacy of photography to maintain the position in which its admirers would place it. Now these remarks, he was aware, would make not the slightest impression on genuine disciples of the art, but he introduced them because adverse criticisms were in some measure merited by the ill choice of subjects the majority of photographers, both professional and amateur, had made, the former generally styling themselves photographic "artists," with what impropriety their specimens too often showed. However, within the last two years there had been very great improvement. The *art* in the first days of photography was totally lost sight of in the excitement produced by the marvels of the *science*, and it is but lately that the camera has been transferred from the hands of the chemist, who has taught us indispensable knowledge, and to whom we could not be sufficiently grateful, to the hands of the artist, who now demonstrates daily the beauty and truth of its representations. The most common subjects represented have been architectural views; and the French photographers have arrived at a great amount of perfection in this department, yet even in the best of their pictures there is often a want of taste in the point of view selected. They are too often taken from an elevation, to prevent the inclination upwards of the camera (which causes the upright lines to converge), and consequently there is a loss of magnitude, and the beauties of perspective are diminished. Again, they are generally "full-front" instead of "in perspective," which latter position is always more picturesque. But it is in landscape that the glorious fidelity of the camera, when its direction is controlled by the true artist, is most evident. None but he can experience the delight of catching the most transient effects of ever-changing nature. It is in this direction that the glorious future of artistic photography lays, and the true lover of nature will delight more in a specimen of this class than in scores of hasty sketches, even by clever men, or in the gaudy and meretricious colouring of the pre-Raphaelite, vainly attempting to delineate by the hand that which the sun himself paints for us in the photograph with such exquisite detail. Photographers are generally too frightened of getting the sun in the camera, as they say, and take their views with its back to their best friend, and thus they lose all the cross shadows which give a stereoscopic effect to a picture, and, in fact, get hardly any shadow at all; as with the sun in the position mentioned, the shadows are all behind the different objects composing the view. He had invariably found that the most pleasing pictures were taken with the sun shining right on the front of the camera, and nearly into the lens; but in this case the precaution must be taken to shield the lens from the direct rays of the sun by the hand or otherwise. Water in motion is rarely reproduced with success, except in instantaneous views, and for the present that must be left to the painter, who by the aid of white paint and hard brushes can give us any amount of cataract. The painter himself even condescends to use the camera for the depiction of foliage and herbage, and photographic studies of foreground are most generally admired for the extreme delicacy with which the veinings and markings of the tenderest herb or flower are delineated; still it must not be forgotten that foregrounds are most lovely when adjuncts to an extended view. The study of composition is as necessary to the photographer as to the painter, and every student of the art may derive much benefit from the study of J. D. Harding's 'Principles and Practice of Art,' which, containing much from which many will dissent, conveys to an inquirer much useful and practical information. With reference to the latter portion of his subject, the author mentioned that calotype paper was, in his opinion, suitable for giving bold effects, though open to objection on account of its want of clear definition and its granular surface. The wax paper was more homogeneous; but both methods are now generally exploded. Albumen on glass gave exquisite definition, and was most successfully used for taking engravings and paintings, on account of the clearness of lines and the absence of dirtiness in the white parts, a fault to which collodion is liable. In his opinion, the albumen-on-glass process could not be improved upon by any of the modern pro-

cesses to which Mr. Ward had alluded. After all, the collodion process seemed the best, notwithstanding the inconvenience experienced by its extreme delicacy. The collodio-albumen process, so much advocated at present, appeared to him extremely unsatisfactory, though the confidence of its supporters was unbounded; and as to the dry collodion process, by it no satisfactory effects have yet been produced, though every effort had been made by its advocates. He concluded by hoping that the remarks he had made might excite discussion, that so any fallacy might be confuted, and any truth confirmed.

The Rev. W. V. Harcourt, who had taken the chair in the absence of the President, deprecated any lengthened discussion on account of the time.

Mr. W. S. Ward said the thanks of the Section were due to Mr. Mercer for his experiments, and, in reference to the last paper, remarked that he could not agree altogether with its author as to artistic difficulties. A tyro in the art would do anything, but a photographic artist could only become one by repeated trials. He did not consider it to be right to change photography from a science to an art; and genuine artistic effects were produced through photography being under the dominion of the chemist and the physicist. To secure the full effect of foliage and of water, much exposure was absolutely necessary. The great practical difficulty was to hit the right point between under- and over-exposure, as the effect of light was more powerful at first than afterwards. He might say that the less a photographer was satisfied with what he had accomplished, the more likely was he to succeed better in future.

Mr. Smith said that he believed the simpler the manipulation and materials the better. He thought the dry process a complete failure. Photographers might be divided into two sections: the scientific, who sought out and experimented upon complicated processes; and the artistic, whose great object was to produce the best effects.

Dr. Odling observed that some instruments had been used by Bunsen and others to determine the actinic force, but they were entirely out of the reach of the ordinary practitioner. He trusted Mr. Fowler would proceed with his researches, and inquired if the decomposition of the solution referred to had proceeded *pari passu* with the length of exposure?

Mr. Fowler replied that probably the first five seconds elapsed without any action whatever.

MISCELLANEOUS.

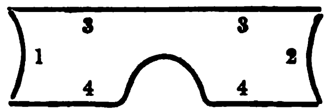
To make Stereoscopic Spectacles.

To the Editor of the Photographic Journal.

Gaydon Street, Barnstaple,
October 16, 1858.

Sir,—As I have not had an application from any one respecting the way to make stereoscopic spectacles (your readers perhaps thinking the advertisement a hoax), I shall not be doing them an injustice by asking you to *publish* (not advertise) it in your next Number,—hoping it will be interesting and useful to the admirers of the stereoscopic branch of photography. John Parker.

Obtain a pair of stereoscopic glasses, about an inch and a quarter in diameter, and put the thin edges towards each other in what spectacle-frame you may choose, in the same way as in the ordinary stereoscope; but in addition to, and instead of the usual spectacle-bridge for the nose, have something, not transparent, fixed between the eye-pieces, two inches long in the shortest part of it, to prevent the right eye seeing the left picture, and *vice versâ*—something the shape of this:



From 1 to 2, two inches; and from 3 to 4, about an inch.

If the frame is made of steel, or any other metal, the bridge may be made of the same material, and soldered to the eye-pieces: any other shape bridge, or any other material may be used, according to taste, so long as the stereoscopic picture *only* can be seen with the spectacles.

It will be necessary, of course, to hold the pictures in the proper position, as they are in other stereoscopes, so as to see them without pain to the eyes, which will be found easy by a little practice.

With this instrument a pack of slides can be taken up and looked at with the result of the usual stereoscope, and a choice selection of subjects can be mounted in a book and seen, having all the pleasing effects which perhaps are only to be surpassed by nature itself. Many pictures are magnified more with the stereoscopic spectacles than they can be with the usual stereoscope, by holding the cards, or book containing the views, &c., nearer to the eyes.

The cost of the glasses should not be more than 3*d.* or 4*d.* by the single pair, and may be had of, or through, any respectable dealer in spectacles.

Printing on Albuminized Paper.

To the Editor of the Photographic Journal.

Chester, Oct 4, 1858.

Sir,—Now that the picture-taking season is nearly over, and many of us have a goodly stock of negatives ready for the printing-frames, would you kindly give us the benefit of your experience on the subject of printing on albuminized paper?

1. What is the best method of salting the paper?

2. What is the best strength for the nitrate of silver solution?

3. What is the best way of making a toning bath?

4. Is it necessary to fix after or before

toning, and with what strength of hypo-solution?

5. What is the safest method of washing the proofs; how long ought they to be in the water; and, *generally*, the most effectual way of securing permanency?

After all that has been said upon these points, much uncertainty prevails among amateurs; and you would be conferring a favour on many photographers who wish to preserve the results of their summer labours, by answering in the next Number of your Journal the questions I have written down.

AN ORIGINAL SUBSCRIBER.

[1. In the early Numbers of the Journal, the mode of manipulation in the preparation of albuminized paper has been already described. Great care is used by many of those who make a profession of it, and probably you can buy it more satisfactorily than you can make it: consult our advertising columns; but reject any which has an unpleasant odour, particularly if gelatine is added to the albumen, which is sometimes the case. The nitrate of silver solution upon which the paper is floated often becomes discoloured, and your pictures will have an unpleasant yellow tone where they ought to be perfectly white. If you determine to prepare your own paper, then use the chloride of barium (which is not affected by damp) in the proportion of 3 per cent. of the fluid, which may be the pure albumen of *new*-laid eggs, or diluted with any portion of water, so as to produce the degree of gloss desired; one drop of glacial acetic acid to each ounce of fluid tends much to make the paper keep, after it has been sensitized with the silver-bath. It has been said that these films of albumen are not coagulated by heat, and it is useless to iron prepared albuminized paper; we can only say, from actual experience, that more agreeable results will take place if the paper is ironed with a very hot iron, the albuminized paper being placed between blotting-paper for that purpose.

2. Sixty grains of nitrate of silver to the ounce of water. If a white precipitate forms during the time you are floating the paper on the solution, you have exhausted your silver from the fluid, and more must be added. This occurs very frequently if you use ——'s papers, who seem to use a needless excess of chloride in their preparation.

3. You will find this well described in Hardwich's Manual.

4. After you have well toned your picture, immerse for at least a quarter of an hour in a solution of hyposulphite of soda—1 ounce to 12 of water.

5. Every trace of hyposulphite must be removed, which may be effected in a short or long time according to the means you resort to for that purpose, the most effectual of which is to use your own hands, and frequently move the proofs. We have seen complicated apparatus of different troughs where the water passes from one to the other, and which are worse than useless unless the prints are often moved, prints thereby getting but little agitation in the seemingly abundant supply of water. We believe, to secure permanency, that photographs should be ironed with an iron as hot as can be used without causing any injury to the paper. The effect of heat in giving permanency is well illustrated in the domestic operation of marking linen. The marking is generally obliterated or deteriorated in the laundry in a very short time unless heat be applied, and then the permanence seems to be ensured.—ED.]

ANSWERS TO CORRESPONDENTS.

GENTLEMEN desirous of admission into the Photographic Society, are requested to communicate with the Secretary, 1 New Coventry Street, Piccadilly, W.

Sir Jephson Norreys.—Many thanks for your most interesting specimen, which shall receive a notice in our next.

R. H. B.—A young man is desirous of learning the art of photography, and wishes to know if any of our readers would teach him; the remuneration to be his services in the art. Should that be the case, we shall be pleased to put them in communication with him.

Thomas Falconer has kindly informed us that in the 'North British Review,' August, 1847, No. XIV. article 8, "On Photography," written by Sir David Brewster, is a short note, being the first published notice of the use of the double iodide of silver in the Talbotype process.

T. M. writes that he is quite satisfied that his gutta-percha bath has been the cause of his failings. With him, as with others, there seems to be some difficulty in obtaining a good porcelain or earthenware one, and he has sought for advertisements in vain. We obtained our own from Mr. Bourquin of Newman Street, Oxford Street.

W. P. (*Newcastle*).—Your letter is under consideration.

O. S. (*Sunderland*).—The mode of copying plans, &c. has been fully described in former Numbers of the Journal, to which we refer you. No distortion will take place if you use a good single landscape lens.

C. H. H. (*Chelsea*).—The prints you have sent seem to fail for want of intensity in the negative. One has evidently been too long in the hypo-bath; hence the yellow tone which pervades it.

W. J. B. (*Harrow*).—Your request has been received; we hope to see you at the next meeting of the Society, on December 7.

Dr. T. L. P.—Your letter containing your address has been unfortunately mislaid, or we should have replied before this.

Mr. Campbell's paper on the Perspective of Photography, and J. B. Spencer, must be postponed to our next.

Some other communications are so evidently adapted for advertisements, that we cannot undertake to reply to them. Statements have reached us that our advertising columns have been made the medium of obtaining postage stamps for which no return has been made. We can only ask our readers to use due caution.

Communications received from—T. D. Eaton, Norwich; J. B. Keene; W. M. Macartney; Amicus; H. P. Robinson; W. Ellis.

All Communications for the Journal should be addressed to the Editor, at the Publishers, Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street, E.C.

THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 73. NOVEMBER 22, 1858.

PROTESTS have reached the Council against an unauthorized and vexatious use made of papers read before the Society. Members complain that notes of their communications, more or less inexact, are taken without their consent and printed without their revision. Against this wrong they claim protection. These pretended reports, they allege, often compromise their fame, and sometimes grossly injure science. In an art inducted by the most delicate experiments, and in which the success often depends on minute accuracy of detail, it is obvious, say the complaining members, that no man can report his trials and successes satisfactorily save the experimenter himself. On these grounds, they declare, with special emphasis, against the appearance in print of any reports of their papers save such as they may themselves furnish for the purpose; and they call upon the Council, in the common interest of Photography and Photographers, to find some remedy for an evil which they deplore and denounce.

The Council have considered the case, and have looked with more care into the existing law of literary and scientific copyright. They have come to the conclusion that a remedy exists for the evil, and at the instance of fellow-labourers in the good cause, they mean to enforce their right. Not that they desire to restrain in any way the free intercourse of Photographers;—on the contrary, they wish the intercourse of thought to be free as air and easy as light. They are eager for publicity, and will never consciously abandon a system of communication and discussion from which they derive their force as a public body. Whoever will aid them to reach the distant observer, the early student, and the heart of the general public, will deserve, and shall receive, their thanks. But as art can derive no benefit from the publication of clandestine and imperfect reports, the Council believe that they are consulting the best interests of science, and maintaining the individual rights of their members, in prohibiting for the future any surreptitious and unauthorized reports of papers read before the Society. The Society is its own reporter. The PHOTOGRAPHIC JOURNAL is the official record of its proceedings. Gentlemen who elect to read papers before the meetings, by that very act select the organ, as well as the time, the language, and the circumstances through which they prefer to make their appeal to the world. It is not to be endured that, after such election, gentlemen should stand in fear of seeing their express designs defeated, their copyright invaded, and their discoveries announced in language not their own, and for which they would be ashamed to admit any responsibility. This wrong must cease. The Council believe they possess power to protect their members; they certainly possess the will, as will be seen from the following resolution, which was passed at their last meeting:—

> "Complaints having been made that the papers communicated to the Society appear in other journals before their publication in the Society's Journal, it is resolved that the Secretary be directed to request the proprietors to desist from such publication."

We must again remind our readers of the near approach of the opening of the Photographic Exhibition at Edinburgh, as no pictures can be received after the 1st and 2nd of December, being the last days on which exhibitors can contribute.

The Nottingham Photographic Society, under the presidency of the Duke of Newcastle, contemplates opening an Exhibition about the 20th of December—the objects being "to encourage the Art of Photography in this neighbourhood,

By collecting the best photographic specimens;
Photographic Literature;

The intercourse of its Members at occasional Conversaziones; and
Periodical Exhibitions, when prizes will be awarded to the best local talent."

We sincerely wish our friends in Nottingham every success and encouragement, and trust that all practisers of the art will afford them some proof of their skill by liberal contributions.

We also hear that at Bath a Society is in process of formation, and that Mr. Tite, their representative in parliament, has extended to it his encouragement; with the patronage of such an admirer of art, we believe perfect prosperity will be the result.

We regret to hear that Mr. Sutton, of Jersey, has met with a serious loss by fire, his laboratory having been entirely destroyed. It affords a caution to photographers to exercise all care in their manipulations.

Mr. Howlett has sent us some specimens of work done with Mr. Ross's new lens; they are placed in the Society's Reading-rooms, and need no observation of ours beyond calling the attention of Members to their beauty, which will be confirmed by their own observation. We may here remark also, Mr. Howlett complains that some of his professional friends have imagined that his copies of Mr. De la Rue's wonderful pictures of the moon are from models, and not from that planet. The idea is so absurd, that the merest tyro in the art will see the fallacy of such a supposition. Mr. Howlett kindly promises at our next meeting to exhibit both the negatives and the impressions therefrom.

Independently of the notice below, every Member of the Photographic Society will receive with the present Number of the Journal a copy of the Rules which are to regulate the approaching Exhibition; and the Secretary will feel a pleasure in affording any additional information which may be sought.

Keeping-processes thicken upon us; the "Times" of the 16th inst. gives the following:

"The plates which it is intended to prepare being properly cleaned, proceed thus. Have four dishes of the usual kind, in three of them put sufficient filtered rain-water (distilled water would be better) to thoroughly cover a plate, in the fourth dish put about the same quantity of raspberry syrup and water, in the proportions of ½ oz. of syrup to 3 ozs. of distilled water. (The raspberry syrup, which there are chemical reasons for using, is that usually sold by confectioners.) Arrange the dishes side by side, the syrup dish being last. A plate is then coated and sensitized in the ordinary manner, and is put, film upwards, in the first water-dish. A second plate is coated and sensitized, and when ready to be lifted from the nitrate bath, the first plate is removed to the second water-dish, the second plate being put in the first water-dish. A third plate is then prepared, and plates one and two moved on to the adjoining dishes; then a fourth plate is sensitized, and at this stage plate one is immersed in the syrup dish, and plates two and three in the second and third water-dishes. After preparing a fifth plate, plate one is ready to be lifted from the syrup dish, and is then placed upright upon blotting-paper to drain and dry.

"In this order the process is continued, the time required for coating and sensitizing a plate measuring exactly the time any other plate shall remain in one of the four dishes. The plates will keep as long, and, in use, are quite as sensitive, as those prepared by any of the existing keeping processes; there are no blistering or albumen difficulties, nor is any special condition of collodion or bath requisite."

We see no advantage whatever in this over the many modes which have already been described—it is a mere variation of Mr. Shadbolt's original ideas; but wishing to keep our readers conversant with all that is proposed, we even intend to print in our next issue another which has been received from a correspondent, who has accompanied it with specimens of his success.

The Photographic Society of London will open their Sixth Annual Exhibition of Photographs early in January 1859, in the Gallery of British Artists at Suffolk Street, Pall Mall.

The Exhibition will not be restricted to Members of the Society, but open to all, subject to the following regulations, viz.:—

1. Negative and Positive Photographs of every description, whether on paper, glass, or other material, including Daguerreotypes, will be admitted, and also Stereoscopic pictures and Stereoscopes.

2. Coloured Photographs will be admitted only when accompanied by untouched copies of the same pictures.

3. Positive Pictures, printed from touched or painted negatives, and also touched or painted positive proofs, must be described accordingly.

4. For the sake of economizing space, the margins of all Mounted Photographs must be kept within moderate limits, viz. not exceeding 3 inches for the largest Pictures, or 2 inches in those under 8 inches by 6 inches.

5. Pictures sent for Exhibition must be numbered consecutively, and accompanied by

a schedule in the subjoined form. Every Picture must be protected by glass, and bear on its front a duplicate of the entry on the schedule referring to such picture.

6. All pictures with advertisements will be rigidly excluded.

7. Exhibitors desirous of selling their Pictures will be permitted to make arrangements for that purpose with the Attendant in charge of the Exhibition.

8. Facilities will also be given to the Makers of Photographic Apparatus, &c., for the Exhibition of such of their productions as may be considered of peculiar interest from excellence of construction or novelty of invention.

9. All works intended for Exhibition should be addressed to Dr. Diamond, Secretary of the Society, at the Gallery, Suffolk Street, and delivered, with all expenses paid, on the 20th of December.

Exhibitors and Members of the Society will have the privilege of free admission, and of introducing one friend without payment.

By order of the Council,
HUGH W. DIAMOND, *Secretary*.

Exhibition of the Photographic Society, 1859.

Name of Exhibitor or Photographer.		Address.	
No.	Description.	Process.	Price.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

FIRST ORDINARY MEETING FOR THE SEASON.

November 9th, 1858.

W. SCOTT ELLIOT, Esq., of Arkleton, in the Chair.

The minutes of the last Meeting were read and approved.

The following gentlemen were elected Ordinary Members of the Society:—Professor MACDONALD, JAMES BRYSON, Esq., WILLIAM GRIEVE, Esq.

The Chairman congratulated the meeting on the Council having obtained for the Society's approaching Exhibition the large and well-lighted Exhibition Rooms in 90 George Street, and urged upon the Members the duty of making every exertion to ensure the success of the Exhibition.

The Chairman afterwards referred to the melancholy death which had occurred since their last meeting, of their distinguished member Mr. IVAN SZABO. He moved that an expression of their sense of the loss which they had sustained by the death of that gentleman should be recorded in the minutes of the Society, which was unanimously agreed to. On the suggestion of the Honorary Secretary, a subscription was afterwards entered into amongst the members to aid in the erection of a memorial to Mr. Szabo in the Southern Cemetery*.

At the conclusion of the formal business of the evening, a conversazione took place, as announced in the billet calling the meeting.

On the table were several objects of interest, which had been sent for inspection during the conversazione.

Mr. John Sang exhibited a collection of Stereographs from flat pictures, chiefly from the engravings of the "Bottle" by George Cruickshank. One, taken from the print of "Omer Pacha and the Allied Generals" published in the 'Illustrated London News,' attracted particular attention, as it gave in the stereoscope the most perfect relief and roundness to every figure and detail.

Mr. Moffat likewise showed a stereoscopic picture taken from an ordinary lithograph by a process of drawing invented by Mr. Walter Hardie of Edinburgh, and for which Mr. Moffat stated that Mr. Hardie claimed priority of invention over any other process having for its object the production of two stereoscopic pictures from a single picture or print,—the original drawings, executed on a large scale for the reflecting stereoscope, having been brought before the Society about six months ago. The stereograph exhibited on the present occasion by Mr. Moffat was very perfect in its relief. It was stated that, as the process by which it was produced involved no injury whatever to the original from which it was taken, there seemed to be nothing to prevent

* Mr. Szabo was by birth a Hungarian gentleman, and had served in the war of independence under Görgy, with the rank of captain, and had also acted as aide-de-camp to General Guyon. Soon after the termination of the struggle, he came to this country, and for some time supported himself in St. Andrew's as a teacher of languages. Learning there the art of photography, he removed two years ago to Edinburgh, where he settled as a professional photographer. His fine artistic taste, combined with his skill as a manipulator, soon brought him into notice in his new profession; and he rapidly acquired a large business. Last year he earned the distinction of gaining, at the Brussels Exhibition, the only gold medal awarded for photographs sent from Great Britain. His sudden death—of which the immediate cause was apoplexy—is deeply regretted by the wide circle whose friendship he had acquired during the short time that he was in this country, and who valued him not less as an amiable and true-hearted gentleman than as a most promising artist in the profession which he had so recently adopted.

the most valuable pictures and engravings being copied by it for the stereoscope. Mr. Moffat added that he was not in the meantime at liberty to explain the process, but it was exceedingly simple.

Several specimens of carbon printing were sent for exhibition by Mr. Pouncy, and excited much interest.

Mr. Taylor exhibited and explained the mode of using one of Spiers's Improved Stereoscopic Cabinets, by means of which 150 stereoscopic slides can be successively shown. This invention may be briefly described as follows. Within a box, the size of which is 15×10×17 inches, is a drawer, with a loose bottom, containing fifty of the slides, which, by the action of a lever, can be raised into position, whilst by a simple contrivance they are left supported on two ledges in connexion with a rack. On a small brass knob outside the box and connected with the rackwork* being moved forward, each slide in succession is brought to the focus of the lenses, and afterwards dropped into the grooved drawer from which it was raised. The box is provided with two drawers for containing the slides. The lenses used are the ordinary prismatic lenses.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

OPTICS.

Mr. Ross's New Lens.

To the Editor of the Photographic Journal.

10, Bedford Place, Campden Hill, Bayswater, Nov. 5, 1858.

Dear Sir,—I think that an account of the first trial of Ross's Petzval lens may not be uninteresting to the readers of the Photographic Journal. About three weeks ago Mr. Ross, at my request, sent me a lens which he had just constructed upon the Petzval principle, to cover plates 18×16.

I carefully compared it with one of his ordinary landscape lenses, made to cover plates of the same size. The first trial was for *copying purposes*, viz. reducing maps and pictures. Now, the great fault of the old form of lens for this purpose is, that straight lines are always more or less curved, even when a very small stop is employed. As it is often necessary to reduce maps in several plates, it is evident that if the lines are much curved the proofs will not join together properly. My first experiment was the reducing a map 3ft.×2ft. on to a plate 15×12 with the common landscape lens, using a stop of $\frac{3}{10}$ths of an inch. The negative was found to be perfectly sharp; but two parallel lines, one at each end of the map, were found to be curved to the amount of $\frac{1}{20}$th of an inch. I now proceeded to repeat this trial, using the orthographic lens with a stop of $\frac{5}{10}$ths. The result was a negative beautifully sharp, while the curvature, if any, was so small that I could not measure it; in fact, *in practice*, the lines were perfectly straight, even when using a stop nearly twice the size of that employed with the old lens. With regard to the time of exposure, using the same aperture, the orthographic lens works rather slower than the old form: but it is hardly ever necessary to do this; the lens is so perfectly corrected for spherical aberration, that a stop of considerably larger aperture can generally be used with advantage.

The week before last I left England for the Continent, taking with me a 10×8 camera, furnished with an orthographic lens. Now, although I was delighted with the way in which this lens had performed while copying maps, I must confess I was prejudiced against it for landscapes. I fancied that, as with the portrait lens, objects in the foreground would be given very much out of focus; so I took care to furnish myself with an ordinary lens of the same focal length. I commenced work one fine morning at Rouen. Here I tried the new lens by the side of the old one, upon almost every kind of picture—street views, fronts of churches, and landscapes; in every case the orthographic lens won the day. The great disadvantage of the old form of lens for architectural photographs is, that if the camera is thrown much out of the horizontal position, the buildings appear to be falling down, and also that all vertical and horizontal lines are *very much curved*. With the orthographic lens this evil is comparatively small, and the curvature of the lines not worth mentioning. Again, the orthographic lens has the valuable property of giving a great many different distances, all of which are in good focus at the same time, and this with a larger aperture than we should ever think of using with the old lens. One of the first

things that strikes the photographer upon using this lens is the very small effect the stops have in improving the depth of focus, whereas in the old lens each stop produces a very marked effect: the reason of this is, that the orthographic lens is better corrected in the first instance, so there is less work for the stop to do.

I may mention that I have also tried this lens for large full-length figures and groups. For this purpose the full aperture may be used; and if the operator has but light enough, he will find it admirably adapted to his wants, giving a true proportion of figure very uncommon in photographic portraits.

That you may be able to form your own opinion of the merits of the orthographic lens, I have sent you a few impressions from negatives taken with it.

Robert Howlett.

PHOTOGRAPHIC CHEMISTRY.

On the employment of Nitrate of Uranium in Photography. By O. Hagen.

[From the 'Bericht der Akad. der Wiss. zu Berlin,' 1858, p. 290.]

Niépce de Saint-Victor has recently made known some new and interesting facts in a scientific and photographic point of view, and, amongst others, a method of obtaining positive pictures from negative ones. If a piece of paper be washed over with a tolerably concentrated solution of nitrate of uranium, left to dry, and then applied to a negative photographic picture, and exposed to the direct light of the sun for a quarter of an hour, a positive picture makes its appearance when the paper is put into a solution of nitrate of silver; this positive picture is very intense, and of a brownish-red colour. Washing with distilled water is sufficient to fix it.

Niépce recommends this method for employment in practical photography; in the first place, on account of the simplicity of the process, and secondly, on account of the indestructibility of the pictures obtained.

The author has succeeded in increasing the sensitiveness of this paper considerably, so that intense positive pictures may be obtained upon ordinary writing-paper in 30 or, at the utmost, 60 seconds of exposure, and upon bibulous paper even in 15 seconds. This sensitiveness is obtained by introducing some small changes in Niépce's process. In the first place, the fibres of the paper to be employed must be freed as much as possible, by separating them from the size. This is effected by laying the paper in boiling water, and boiling it for some time. The paper is then taken out, pressed between blotting-paper, and laid, whilst still damp, upon the solution of nitrate of uranium. It is advisable not to dry the paper completely before doing this, as otherwise any size that may be present attaches itself again to the fibres, and impedes the contact of the salt with them.

Care must also be taken that the uranium salt employed contains no free nitric acid; for the more free acid it contains, the less sensitive is the paper soaked in it, and the redder are the pictures produced. Niépce states that a solution of the uranium salt is obtained by dissolving oxide of uranium in nitric acid. In this he has probably not taken into consideration the free acid.

The other matters intermixed with commercial oxide of uranium, such as copper and arsenic, also diminish its sensitiveness and injure the tone of the picture. These metals, therefore, must be removed by sulphuretted hydrogen.

Lastly, pictures of much greater intensity are obtained when a little alcohol or ether is added to the aqueous solution of the silver salt. This addition is very important, as the time of exposure may be considerably shortened thereby.

By observing these conditions greyish-black pictures are obtained, whilst Niépce produced them of a brownish-red tint.

The *rationale* of the above precautions is evident, at least in part, from the explanation of the chemical process. Hagen regards this as similar to that which takes place in alcoholic solutions of nitrate of uranium. If two such solutions, one of which is covered with a black screen, be placed in the sun, only that which is reached by the sun's rays becomes blackish green, whilst the other retains its pale yellow colour. In the first solution the peroxide of the uranium salt becomes converted into the lower grade of oxidation. If nitrate of silver be then added to both solutions, silver will be reduced only in that which contains protoxide.

If an alcoholic solution of nitrate of uranium, which has been rendered blackish green by exposure to light, be placed in the dark with free access of air, it resumes its pale yellow colour, the protoxide being converted into peroxide by the atmospheric oxygen.

In Niépce's process, according to Hagen, the fibres of the paper replace the alcohol, as it is these which, under the influence of light, convert the peroxide of the nitrate of uranium into protoxide. The uranium paper, when exposed to the light, consequently acquires a colour which is exactly similar to that pro-

duced when an alcoholic solution of the proto-salt is dropped upon white paper.

That the fibre of the paper, and not any other constituent, such as the size, is the agent, is evident from the fact that very intense pictures are produced upon chemically pure Swedish filtering paper.

From this explanation of the chemical process, the injurious influence of free nitric acid may be easily explained. When the uranium paper is laid, after exposure, upon the solution of nitrate of silver, the silver is reduced by the reconversion of the protoxide of uranium into peroxide; so that if an oxidizing agent, such as nitric acid, be present, this will furnish the oxygen, which would otherwise be yielded by the oxide of silver.

As light exerts an alterative action upon an alcoholic solution of nitrate of uranium, it easily occurred to the author to apply alcohol also in Nièpce's process. If the uranium paper be moistened with alcohol, applied to the negative picture, and exposed to the sun, no picture is produced, even after treatment with the silver salt.

But if ordinary uranium paper be exposed, and then laid in a solution of silver containing a little alcohol, the picture, as already mentioned, is more intense than without this addition. Perhaps in this case the alcohol has a similar action upon the oxide of uranium, as pyrogallic acid has upon iodide of silver exposed to the light in the ordinary photographic process.

With the above modifications, Nièpce's process might even now be adopted in practical photography. The different processes are so simple, and follow so rapidly one after the other, that sixty copies may be conveniently made in an hour in the light of the sun.

Hagen has hitherto endeavoured in vain to render collodion sensitive by the addition of nitrate of uranium. On the other hand, he has prepared negative pictures directly upon uranium paper. The sensitiveness of this is, however, far inferior to that of paper coated with iodide of silver.

If uranium paper which has been exposed to the sun, and acquired a greenish-grey colour, be kept in the dark for a few days, it again becomes yellow, as Nièpce remarks: the protoxide again takes up oxygen from the air. This paper may therefore be prepared a long time before it is wanted for use. This, and the property that it need not be treated with the solution of silver until six to twelve hours after exposure without the picture losing much in intensity, are advantages which will be particularly welcome to travellers.

Modus Operandi of Preservative Agent in the "Fothergill Process," and applicability of this Process for Stereoscopic Transparencies.

To the Editor of the Photographic Journal.

Leamington, Nov. 9, 1858.

SIR,—In the Journal of Oct. 21st, I find two of your correspondents—"Mr. Ebbage," and an "Amateur" — refer to the *modus operandi* of the preservative agent, albumen, in the Fothergill process; and the former wishes a reply to certain queries relating more particularly to the way it acts in connexion with the nitrate of silver. Having from the first made myself practically acquainted with the peculiarities of this now favourite process, and interested myself in its successful application, I venture to reply, intending to confine myself to easily illustrated facts, and to make the subject as practically useful as possible to the generality of your readers; but before doing so, courtesy and inclination incline me to acknowledge the complimentary manner in which "Amateur," in particular, connected my name with the successful practice of this process.

The following are the queries of Mr. Ebbage's referred to; and as the reply will also explain my reason for differing in some respects from "Amateur," I shall confine myself to them. 1st. Whether *any combination* takes place between the *albumen* and the *silver*? If so, 2nd, Is it *chemical* or otherwise? that is, 3rd, Can there be such a *compound* formed as *albuminate* of *silver*? or does, 4th, Albumen merely, by apposition, fill up (as sugar, honey, gum, &c.) porous cells of collodion, and afford an attenuated covering whereby a sufficient quantity of silver is retained after a *gentle* washing, and thus the albumen, *per se*, protect sensitiveness of plate? The italics are here introduced by me. Query 1st. Does *any combination* take place between the albumen and silver? The following experiments will show the reply to this must be in the affirmative. If we mix together a solution of nitrate of silver and clear-strained albumen diluted with a little water, a precipitate or coagulum will be formed; collect this, and well wash with distilled water, to remove all uncombined nitrate of silver or albumen; dry a portion at a moderate heat—about 120° F.—in the dark, and expose to the light, by the side of another portion not dried; both will change—the dry rather the quicker—from a light colour to a bright chocolate. And if albumen containing *ammonia* is used to a very deep chocolate approaching a black, rub another portion in a mortar with distilled water to the consistence of thin cream; pour off part of this, and add

to it either concentrated nitric, sulphuric, or hydrochloric acid; a precipitate similar in appearance to the original one, but more tenacious, is obtained, which, when washed, is similarly acted upon by light, though less quickly. After the other part has stood a few hours, filter and preserve the clear liquid; this will be found to have the metallic taste of silver with that of the white of a very fresh egg boiled until not *quite* set; it becomes slightly opaque on the addition both of albumen and solution of nitrate of silver, and of a deep brown colour when boiled for some minutes in a test-tube. The above, it will be observed, answer both 1st and 2nd queries; for they not only show that there is a union of the albumen with the nitrate of silver, but that it is a chemical one; that the compound is sensitive to light, undecomposed by the strong mineral acids, slightly soluble in water, the solution forming an insoluble compound both with excess of albumen and nitrate of silver, and decomposed at a high temperature combined with a strong light. In addition, Gregory's, Fownes', and other works on chemistry treat of albumen entering into chemical combination with the salts of the metals. To the 3rd query, Can there be such a *compound* formed as *albuminate* of *silver*? the reply must also be in the *affirmative*, shown as follows:—Precipitate oxide of silver from a solution of nitrate by lime-water; collect and wash it until the washings are not affected either by lime-water or solution of silver; put it into distilled water, and let it remain several hours, occasionally stirring, that the water may become saturated with oxide. Filter, and to the filtered solution of oxide of silver add, in a test-tube, a few drops of clear albumen, an opacity or slight milkiness will soon be apparent. Where albumen has passed down through the liquid, showing that an insoluble, or nearly so, compound has been formed, and as the solution contains only oxide of silver and albumen, it may fairly be termed an *albuminate* of silver. This, however, I do not think is the compound produced in the "Fothergill Process," for we have nothing to indicate that the nitrate of silver is decomposed; and the term albuminate of silver, when applied to it, is a misnomer; it is, however, the one commonly used to denote the compound of albumen with nitrate of silver—probably albumino-nitrate of silver would be more correct. The 4th query, Does albumen merely act by apposition? &c., is theoretically answered negatively by previous experiments, but I think practically not entirely so: if we take a thirty-five grain solution of nitrate of silver in a test-tube, and drop into it prepared albumen, the union of the two only takes place where they first come in contact; the coagulum that is formed acting as a barrier to their doing so further, and the upper and lower strata remaining unchanged. Now apply this principle to the porous cells of the sensitized collodion plate, the surface of which has been properly washed, and we shall have both a chemical and mechanical action—*the formation of a highly sensitive chemical compound, which also mechanically retains a portion of free nitrate of silver excluded from the action of the atmosphere in the pores of the collodion film.* This view of the action of the albumen shows the correctness in principle of the plan of using this preservative introduced by Mr. Fothergill, and also explains the superior sensitiveness of it over all others, while it does not affect the validity of the chemical theory held by Mr. Prichard, and mentioned by him in his letter in the May Journal at the time that Mr. F. made known the process, nor the instructions in my Pamphlet founded upon it, and which have been followed with so much success by both your correspondents, as well as by others in all parts of the country. The following brief summary of the manipulatory part of this process, with the *why* and *wherefore* explained by the foregoing experiments, may prove acceptable, as it will enable the operator in preparing his plates not only to detect the cause of, but to see how to guard against, the failures to which this process, with all others, is liable when not properly carried out.

And we will commence with the sensitized plate. It has been before shown that prepared albumen is coagulated by a strong solution of nitrate of silver; but this is not the case when the latter is diluted to a certain point, a milkiness then only being produced. The object, therefore, is to dilute the silver solution on the surface to this point without altering that in the pores of collodion. This is obtained by using the quantity of water in the manner I have previously described in this Journal and given in my pamphlet, which is just sufficient to reduce the silver solution past coagulating point, but, from its lesser specific gravity, is not on long enough to mix with that in the pores.

The necessity for the *new* dilution all over the plate, on which I have laid so much stress, will now be evident, as, wherever the solution is more concentrated, a thin coagulum of the albumino-nitrate compound will be deposited on the surface, which, adhering too firmly to be removed by the subsequent gentle washings, will, on applying, develop or show itself in a dark mark or marks. A knowledge of the fact that the coagulum compound of albumen and silver is highly sensitive, and of the manner in

which it is formed only where the two come immediately in contact—as shown by the experiment in the test-tube—explains the necessity of *entire* removal of all *surplus* albumen, which if left would dry into a horny coating or varnish, non-sensitive, in a measure impervious to develop, and a preventive of its proper action on the sensitive surface beneath,—also for the *gentle* washing recommended, that the strong silver solution in the first instance, and albumino-nitrate compound in the second, *may not be displaced from the pores*; or light non-sensitive patches will appear on development. In addition to the experiments mentioned, I found *cyanide* of *potassium dissolved* the albumino-silver compound in *all* its forms, moist or dry, decomposed or unaltered; it is therefore quite unsuitable for fixing negatives obtained by this process, for which hyposulphate of soda should be always used. I would here, while upon the subject, call attention to and caution against *over*-development of the negatives, by which otherwise excellent pictures are entirely spoilt.

Many are apt to be led into this error from negatives by this process not *appearing* so dense as those by the wet and some others, though at the same time they are sufficiently so, and the silver is continued to be laid on until half-tones are completely lost. I have previously directed attention to this in another publication, and am pleased to find it is being noticed by others, by the Report in the Liverpool Journal of the Meeting of the Charlton Photographic Society. I am inclined to attribute the beautiful results obtained by Mr. Ebbage (evidenced in the specimens to which you directed attention in a former Number), in conjunction with other things suitable, to the judgment displayed in the development of his negatives.

In conclusion, I would draw attention to another purpose; this process appears peculiarly suited, from the faithfulness with which it gives the most delicate outlines, viz. for stereoscopic transparencies. I have heard of its successful application for this purpose; my own experience is, however, at present limited, but, so far as it has gone, has been decidedly favourable, and inclines me to prefer a gallic instead of pyrogallic developer, the tediousness of which would probably be obviated by the use of a developing-dish, as advertised by Mr. Pyne, I think, of Manchester, by which the plate, being placed on the developer face downwards, would not require the constant motion, to prevent deposit of silver in waves, otherwise necessary. In a future Number I hope to be able to give more particulars on this subject, should not some of your correspondents in the meantime give us the result of their experience, and render it unnecessary.

Alfred Keene.

APPARATUS.

On the Stereomonoscope, a new Instrument by which an apparently *Single Picture produces the Stereoscopic Illusion.* By A. Claudet, Esq., F.R.S.

[From the 'Proceedings of the Royal Society,' April 15, 1858.]

In a former paper "On the Phenomenon of Relief of the Image formed on the ground-glass of the Camera Obscura," which I communicated to the Royal Society on the 8th of May 1856, after having investigated the cause of that extraordinary fact and tried to explain it, I found that the images produced separately by the various points of the whole aperture of an object-glass are visible only when the refracted rays are falling on the ground-glass in a line nearly coinciding with the optic axes; so that when both eyes are equally distant from the centre of the ground-glass, each eye perceives only the image refracted in an oblique direction on that surface from the opposite side of the object-glass. Consequently each side of an object-glass, in proportion to its aperture, giving a different perspective of a solid placed before it, the result is an illusion of relief as conspicuous as when looking naturally at the objects themselves.

From the consideration of these singular facts, unnoticed before, I was led to think that it would be possible to construct a new stereoscope, in which looking with both eyes at once on a ground glass at the point of coalescence of the two images of a stereoscopic slide, each refracted by a separate lens, we could see it on that surface in the same relief which is produced by the common stereoscope.

This instrument, as may be perceived at once, is nothing more than an ordinary camera obscura supplied with two lenses, each mounted on a sliding frame in order to be able to give them, according to the focal distance, the horizontal separation necessary for producing on the ground-glass the coalescence of the images of the two sides of a slide placed before the camera.

The slide itself being cut in two parts, the two images can also, moving in a groove, be separated in a horizontal direction, until they are sufficiently apart to be refracted on the ground-glass by the two lenses in the most oblique direction consistent with the production of a well-defined image; for it is to the increased degree of obliquity of the refracted rays in falling on the ground-glass that is due the

more effective extinction or evanescence of the image for the eye, whose axis consequently deviates in a greater degree from the line of refraction.

By the same principles which produce the phenomenon of relief of the image formed on the ground-glass of the camera obscura, the right picture of the slide, being obliquely refracted on the ground-glass by the right lens in a line coinciding with the axis of the left eye, is visible only to that eye; and the left picture, being refracted obliquely by the left lens in an opposite direction coinciding with the right eye, is only visible to that eye. Consequently each eye seeing only one image, and that image having its own perspective, the optic axes have to converge more or less according to the angular separation of the similar points of the two coincident images; and by the different degrees of convergence producing single vision of these various similar points, we have the sensation of the comparative distances of the objects represented on the ground-glass.

Before having constructed this new stereoscope and tried its effect, it would have been hasty on my part to pretend that its success was certain; and for this reason I took care in my former paper to propose it as a mere speculative idea suggested by the phenomenon I had discovered, without vouching for the result. Indeed it was not long before I had to congratulate myself on my caution, when I found that, the truth of my experiments being questioned and the deductions from these experiments denied, my proposed stereoscope was declared impossible, as being founded on principles completely at variance with the laws of optics.

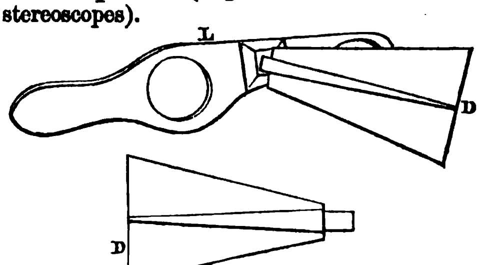
However, these remarks did not shake my conviction; and after the usual difficulties, I have now the satisfaction of being able to prove that I was perfectly right, and that I had not been led astray by any erroneous notion in my analytic and synthetic deductions. I have constructed the instrument which I propose to call the *Stereomonoscope*, as it exhibits in perfect relief a picture which *appears single* on the ground glass of the new instrument, and *as single* as the image of the camera obscura has always been supposed to be.

The instrument, in its present rough state, is undoubtedly very imperfect and susceptible of many improvements which time and experience will suggest. I present it as the result of a first attempt, hoping that it will be found curious as illustrating a new and interesting scientific fact, and producing an effect quite unexpected in optics.

Stereoscope for Books.

9 Kidbrooke Terrace, Blackheath, S.E.
Oct. 19, 1858.

SIR,—Having lately contrived a new form of Portable Stereoscope applicable to books illustrated with stereoscopic pictures or otherwise, and it being found to offer some advantages over other forms, I send you a drawing, with the hope that it may be useful to some of your numerous readers. The advantages of the new form are as follows:—great simplicity, *easily* and *cheaply* constructed, durability, packing into the *smallest* compass, *and shutting out side pictures* (a great defect in all book stereoscopes).



The diaphragm, D, is formed of card-board, strengthened by slips of wood on each side, which are formed into a cylindrical plug to fit into the lens-holder L when in use, the whole made black to absorb light. The diaphragm, when inserted into its place, should be just the focal length of the semi-lenses, with its broad end placed *in contact* with the *intersection* of the two pictures, vertically, and about three inches wide, the usual depth of the stereoscopic pictures. When in use, the diaphragm *is seen double*, one on each side of the pictures, shutting out the side pictures like a box-stereoscope fitted with a diaphragm. The lens-holder is made of mahogany with lenses the proper width apart, having a focal length of six or, at most, seven inches. In the centre of the holder is fastened a rectangular piece of wood about $\frac{3}{8}$ths of an inch thick, furnished with a round aperture to admit the end of the diaphragm, which, when the instrument is not in use, is removed, and can be packed in the smallest possible compass. Should you like to see the instrument in action, I will send you one *by post*. J. B. SPENCER.

PATENTS.

Specification of the Patent granted to WILLIAM EDWARD NEWTON *for an Improved Process for producing Photographic Pictures or Designs on the Surface of Stone or Metals so that Impressions may be taken therefrom by the Process of Lithographic Printing.*

THIS invention has for its object the produc-

tion of a photographic picture upon the surface of a lithographic stone, from which impressions may be taken by the ordinary process of lithographic printing, by which I am enabled to greatly multiply the results of photography, and to avoid the tedious and expensive process of drawing upon the stone by hand as at present practised. In the ordinary process of lithographic printing, the surface of the stone, after the drawing is completed, is washed or coated with a solution of gum-arabic in acidulated water. The gum thus applied enters into a close union with the surface of the stone, or adheres with great tenacity thereto, so that it cannot readily be removed by washing, and thus protects it from absorbing the ink employed in the printing process. In the process of photo-lithography it is found, however, that the gum-arabic adheres so closely to the stone as not to be readily removed by washing from those portions not fixed by the light. On this account, in the experiments heretofore made in photo-lithography, it has been found impracticable to employ this gum, and a solution of gelatine has been used in its stead. Stones thus prepared, however, yield but few impressions, and are of comparatively small value in the arts. To remedy this difficulty is the object of this invention, which consists in the employment of gum-arabic which has been deprived of its power of intimate union with the stone, at the same time that it is rendered capable of becoming fixed or insoluble by the operation of the light. When a stone treated with the above prepared gum is subsequently submitted to the action of a solution of soap, the unlighted portions of the gum are readily and expeditiously removed, while the lighted portions are not injuriously affected thereby, at the same time that the soap performs its well-known duty of forming the insoluble soap upon the stone to produce the body or printing surface. The stone, after being prepared in a manner which will be more fully explained hereafter, has the following solution applied to its surface:—Water, one quart; gum-arabic, 4 ozs.; sugar, 160 grains; bichromate potassa, 160 grains; the sugar retarding the immediate fixing of the gum upon the stone, and the chromic salt causing it to become more firmly fixed, or much less soluble on exposure to the light. The stone thus prepared is preserved in the dark until required, and when the coating is dried it may be exposed in the camera a suitable length of time to fix the gum upon those parts of the picture where the lights are to appear, or it may be covered by the print or picture to be reproduced and exposed to the light. After it is thus "lighted," the stone is washed with a solution of soap, which attacks the stone, removing the coating and fixing itself (or an insoluble soap formed by the mutual decomposition of the stone and the soap employed) upon the surface in place of the coating removed. Where the gummed surface has been entirely protected from the light the gum is easily removed, and the soap has free access to the stone, and the consequence is a thorough union of the soap with its surface; where, on the contrary, the lights were strong, the gum, having been rendered much more insoluble, is protected from the action of the soap, and is not affected by it; and at all intermediate points the effect of the soap upon the stone is inversely proportionate to the extent to which the gum was fixed by the light. The most delicate grades and tints of light and shade may thus be produced upon the stone true to nature as the photographic picture itself. The stone, having been thoroughly washed with the clean water and dried, now receives a coating of ink from the roller, which, uniting with the soap already deposited thereon, serves to give additional body to the picture, and shortly after the stone is ready for the printer; the portions which have been protected by the undissolved or "lighted" gum when wet resisting the ink. Previous to the commencement of the above-described process the stone is to be prepared, and this preparation will vary according to the nature of the picture or subject to be produced. If it be a manuscript, a lithograph, line engraving, or any plan or line drawing without gradations of shade or shadow running the one into the other, a polished surface may be employed. This will not answer, however, so well for portraits, landscapes, and a great variety of other pictures in which the variations of shade blend the one into the other; in such cases it becomes necessary to give the stone a roughened surface, or in the language of the workman, the stone is "grained." Into such a surface the chromated solution of gum sinks deeper, and is then removed more or less according as it has been fixed by the light, and thus the required variations of intensity and the gradations of shade and shadow are produced. Where a polished stone is employed the chromated gum lies upon the surface, and it is found that the variations of shade and shadow cannot be produced with that nicety necessary to make a perfect graduated picture such as a portrait that shall be easily printed.

In preparing the chromated solution the proportions of the ingredients given above are by no means rigid, though they are those which we have found to answer the purpose. The sugar, we have found also, may be replaced by other substances, such as molasses, acetic acid,

or various acetates not decomposable by the bichromate of potassa. I do not therefore confine myself to the exact proportions given above, nor even to the use of the exact substances named when there are equivalents for them which may be used in their stead without departing from the essence of this invention. And in place of removing the unlighted portions of the coating by means of the direct application of soap, they may be washed off with water, acetic acid, or their equivalents; oils, resins, or printing inks being applied after the stone has been dried for the purpose of forming the required insoluble soap in the stone; such process is the entire equivalent of the one above described, although it is neither so expeditious nor so efficient. The quality of the soap employed is not rigid, though those containing a proportion of resin will in general give a better result. The strength of the saponaceous solution is not material; half a pound of soap to six quarts of water has been found to answer the purpose. Heretofore this process has been spoken of as applied to lithographic stones; but there are other substances which may be employed in lieu of the stone to which it may be applied, one of which is zinc, which has been heretofore used by printers as a substitute for stone; in the use of this metal an insoluble soap of zinc is formed instead of one of lime.

Having now set forth the nature of this invention, and explained the manner of carrying the same into effect, I wish it to be understood that, under the above recited letters patent I claim the employment of gum-arabic deprived of its power of intimate union with the stone by means of sugar or its equivalent, as set forth, and in combination with the above I claim the use of soap, as set forth, for the purpose of readily removing the unlighted portions of gum, and of forming the printing surface, as described.

Specification of the Patent granted to Charles Cowper, *of Southampton-buildings, for improvements in Photography.*

This invention relates to the production of photographic images, pictures, or proofs without salts of silver. For this purpose carbon or other pigment is employed; and it is fixed on the paper or other surface by means of a preparation which is acted upon by light. If gelatine or gum be added to a saturated solution of bichromate of potash or ammonia, and the mixture, after being dried, is exposed to solar light, the gelatine or gum is rendered insoluble in water. If, before exposing the mixture to light, an insoluble colouring material is added to it, such as carbon or black-lead for a black colour, vermilion or carmine for a red colour, indigo for a blue colour, or other pigments or mixtures of pigments, the result is, that when the mixture is exposed to light, and thus rendered insoluble, the colouring matter or pigment is imprisoned or retained by the mixture, and rendered indelible. When such a preparation is exposed to light, under a photographic negative or other transparent or partially transparent picture, and is afterwards washed with water, the pigment becomes fixed at those parts where the light acts upon it, but is removed by the water from the parts which are shielded from the light, so that the picture is reproduced in a similar manner to that in which pictures are reproduced by the ordinary photographic processes with chloride of silver. This mode of proceeding is not new; but in applying this principle in practice, there are certain difficulties to be overcome: thus it is necessary to preserve the whiteness of the paper in the whites of pictures, and to prevent the adhesion or fixing of the pigment or colouring matter in the parts which have not been exposed to light, and also to employ the pigment in an extremely fine state of division; for in the ordinary photographic processes the molecules of silver may be said to be in an infinitely fine state of division. It is also necessary that the particles of colouring matter should be spread as uniformly as possible upon the surface of the paper, and to give to the last operation of the washing a liberty of action, such that the molecule or particle of pigment which is not fixed may not carry off with it, by its proximity or adherence, the neighbouring molecules, which ought to be fixed by the action of the light. A saturated solution of bichromate of potash is heated in a water-bath, and a quantity of gelatine is dissolved in it. For one quart of the saturated solution of bichromate of potash, from one ounce and a half to three ounces and a quarter of gelatine may be employed; or, in lieu of gelatine, from ten ounces to sixteen ounces of gum-arabic, with a slight addition of albumen, may be employed. The strength or density of the solution or chromo-gelatine should be such that it is syrupy at a temperature of 140 degrees of Fahrenheit's thermometer, and becomes solid or gelatinous when cold, and does not crystallize in cooling, and affords a film or thickness of the mixture on the surface of the paper immersed in it. This mixture or bath is used hot or warm; and the paper is either entirely immersed or floated on the surface. The immersion may vary from two to six minutes, according to the intensity of the light and the season of the year; the more powerful the light, the stronger may be the solution and the

longer the immersion. The paper, after removal from the bath, is suspended in a hot and dry place until quite dry. All these operations must be performed in the dark, or by artificial or yellow light. The carbon, or other colouring matter or pigment, is now to be applied to the prepared paper. The colouring matter being insoluble, the perfection and delicacy of the proof will depend on the application of the colouring matter in an extreme state of division. The preparation of the paper, therefore, consists of two operations: first, the application of the chromo-gelatine to the paper; and, second, the application of the colouring matter, not to the surface of the paper itself, but to the surface of the layer or film of chromo-gelatine on the paper, by which means the proof admits of being perfectly cleared or cleansed, as hereinafter described. The colouring matter may be applied in various ways,—by the dry process or the greasy process, or by the wet process. By the dry process, the dry coated sheet of paper may be rubbed, mechanically, with the colouring matter spread upon a pad or rubber of cloth or leather: this method is particularly adapted for the application of plumbago or black-lead. The operation is facilitated by moistening the rubber or pad with alcohol. The colouring matter ought to be spread as uniformly as possible. By the greasy process, carbon or ivory-black, or lamp-black, or other suitable pigment, is ground up very fine with nut-oil or other suitable oil, and applied to the coated paper by a pad or dabber. As soon as this mixture has been uniformly applied to the paper, it is immersed very quickly in a bath of sulphuric ether, either alone or with a slight addition of collodion. This last mixture has the effect of drying the paper or removing the oil, and of causing the colouring matter to adhere to the surface. By the wet process, a bath is employed, composed of carbon or Indian ink, very finely ground with water and gelatine, and a small quantity of gum-arabic or dextrine. The coated paper may be immersed from ten minutes to three-quarters of an hour in this bath, according to the thickness of film or layer which is desired: this bath containing gelatine is employed warm or hot. A bath of Indian ink, with alcohol added to it, gives good results when the paper is removed rather quickly from it. The paper or other substitute surface having been prepared in the dark, as above-described, is then exposed to sunlight or daylight, or other light of sufficient chemical power, either in the camera obscura, or in contact with, or in close proximity to, a photographic negative or other article to be reproduced, in the same manner that ordinary photographic paper is employed. After exposure to light, the proof is fixed and cleared by simply washing it in hot water, either with or without friction, by a brush or sponge. The water dissolves out the gelatine or gum which has not been acted upon by the light, and washes away the colouring matter from those parts which constitute the lights of the picture; while the parts which have been acted upon by the light remain undissolved, and retain the carbon or colouring matter. The proof may thus be considered as an engraving produced by light, and not liable to be acted upon or faded by the agencies which injure ordinary photographs. A great variety of colouring matters, or mixtures of colouring matters, may be employed in the manner hereinbefore described. Gold and silver, in the metallic state, and in impalpable powder, may be employed in the same manner: various effects may also be produced by applying different colours to the different parts of the paper or surface. It will be seen that the paper or other surface is always covered with a layer or film, on which the colouring matter is superposed and fixed. When the colouring matter is mixed with the chromo-gelatine, and applied at once to the paper, it is very difficult or impossible to wash it off, so as to leave the lights of the picture clean and white. The application of the carbon or colouring matter by superposition, in the manner hereinbefore described, is intended to obviate this defect.

The Patentee claims, "the mode or modes hereinbefore described of producing photographic proofs or pictures, by means of carbon or other colouring matter, applied by superposition, as hereinbefore described."

MISCELLANEOUS.

On the Perspective of Photography.

To the Editor of the Photographic Journal.

Niddry Lodge, Kensington W.,
June 1, 1858.

One of the greatest defects in photography is distortion.

It is usually thought that, because the art is mechanical, photographs must be exact representations of the objects portrayed. But nothing can be further from the truth than this notion.

In the first place, it has been shown by Sir David Brewster and by other eminent writers, and it is self-evident, that a camera, which is a *large* artificial eye, must see objects and parts of objects which no human eye ever could see at the same time, and that this imperfection increases with the aperture through which light is admitted. If I may use the expres-

sion, a large camera sees round a corner, for it sees together points some of which are invisible to an eye. The sensitive plate is the retina of that artificial eye, the photographic camera: and when the impression made on it is transferred to a human retina by looking at a photographic picture with one eye, the impression produced differs widely from that which would be produced by looking at the reality, because some of the points represented in the picture would be invisible in the reality. In the second place, the artificial eye is square and its retina flat, while the real eye is spherical and its retina is curved. I believe it to be impossible to produce by photography a transparent flat picture to coincide in all points with the object it represents, when placed between that object and one eye, and yet it is necessary to produce such a picture before the object can be truly represented. A correct picture could be *drawn* on glass, for example on a window.

Light proceeds in straight lines through a medium of equal density, and straight lines of light are drawn from every visible point outside a window, through the glass, to the eye of an observer. If the points where these lines pass through the glass were properly marked, a true picture would be produced. This test can be applied to transparent photographs, and they will be found wanting.

Other distortions arise from the construction of lenses, to which I need not refer, as they are foreign to this subject.

My wish is to call attention to a very common and palpable evil in single photographs, which can be so far diminished as to be of small importance, and that very easily.

Two similar objects at different distances, but near the observer, appear to be of very different sizes. A man, for instance, at a distance of two yards appears to be a great deal larger than one of equal size at three; a marble placed close to the eye will appear to be larger than both. The images formed on the retina at the back of the eye, cover a larger or smaller portion of it, according to the distance of the objects from the observer who looks at them, and one of the impressions produced by an image formed in one eye is the idea of *size*. If the two men and the marble keep their places while the observer retires, their *relative* apparent proportions change rapidly, and approach their real proportions as the distance increases. At about 20 yards the nearer figure appears to be larger than the other, and the marble still seems larger in proportion than it is in fact, but *not so much larger*, and at 100 yards the apparent variation in size is hardly appreciable. The same thing that takes place in an eye takes place in a camera, but to a greater degree, because of its form. The proportion which images of objects at different distances bear to each other when projected on a flat surface, such as ground-glass, varies according to the distance of the objects from the camera, still more than it appears to an observer to vary as he retires from them.

What is true of one object is true of all, and of all parts of objects. The perspective of *near* objects is what is called violent, and is still more exaggerated by the form of the camera. As most photographs are taken at short distances, the main cause of their distortion is as clear as the distortion is evident. A palliative for the evil is to take portraits at greater distances, and to omit the immediate foreground of landscapes altogether. Portraits should never be taken at less than 30 feet; the nearest object in a landscape should be still further from the camera, viz. 30 yards.

In most portraits the nose of a full face is exaggerated, because nearer to the lens. The cheek of a profile is swelled for the same reason—in proof of the fact I send a portrait taken at a short distance. If a sitter, facing the lens, throws back his head, his chin is nearer, and is enlarged: if he looks down, his forehead approaches the lens, and becomes too large in the picture: if he throws one hand over the back of a chair, and rests the other on his knee, the nearer hand becomes that of a giant, the other that of a pigmy; neither is in focus, neither is the hand that should belong to the head, which is at an intermediate distance, and of intermediate size—a sitter becomes a misty combination of men of various sizes, be cause partially in focus, and seen in violent, exaggerated perspective. Now most photographic portraits are taken with large lenses at very short distances, and generally produce dismay and amazement in the sitter and his friends; for in striving to get the whole figure near one plane, so as to diminish distortion and keep as near the focus as possible, the sitter is fixed in some unusual attitude: he looks his very worst while trying to keep steady in his new and constrained position, and the photographic result usually is, *not* a representation of the man as we know him, but rather a distorted caricature of the man when uncomfortably placed, and while his face wears a disagreeable expression.

The evil is glaring, the remedy is simple. If distortion is caused by taking pictures at small distances (and it is), pictures should be taken at greater distances. At about 20 yards, figures and groups of figures, though still distorted in a small degree, appear to bear a better proportion to each other and to their own limbs

and features. Portraits taken at that distance are nearly true representations, because the perspective is not so violent, and because the surface covered by the picture is so small that the flatness or curvature of the sensitive plate is of small importance. The contrast in the drawing of the specimens which I send is evident. It is true that only one plane can be in focus at once, but the difference between the foci of two points at 19 and 21 yards is so slight as to be inappreciable. At 20 yards a sitter may take that attitude which best suits him: a group may place themselves as they please within a certain limit, and a camera will copy them without greatly distorting them, if they sit still for eight or ten seconds. It follows that pictures in tolerable drawing can be produced at about 20 yards which at three or four could not be focused, and which would be out of drawing if it were possible to take them. But it will be said that such pictures are too small. With a $\frac{1}{4}$-plate Ross lens, which I use, 6 feet at 20 yards covers about half an inch.

A dozen figures may be compressed into the size of half a crown; the picture is better than larger pictures, but it cannot be seen without the aid of a strong magnifier.

That objection (if it be one) can easily be removed: negatives taken with lenses of short focus at 20 yards must be small; but by heating them red-hot, they become positives of great clearness, which can be well seen with a lens. It is a saving in materials to work with small glasses: an apparatus for taking small negatives can be carried in the hand and costs little, while one for large negatives costs a fortune, is a baggage-train in itself, and is often thrown aside when purchased as too troublesome, cumbersome, and expensive to be worked by any one who does not earn his living by hard labour. A $\frac{1}{4}$-plate lens, if really good, and a sliding camera 4 inches square, will take negatives large enough to be seen by good

[To be concluded in our next.]

A few Remarks on Printing by Carbon and other Pigments by the aid of Bichromates and other Metallic Salts, along with Gelatine, Gum, or other animal and vegetable substances. By J. C. Burnett, Esq.

Carbon-printing, as first spoken about in this country, by means of smearing lamp-black over paper, without having given the latter a previous coating of albumen or other glaze, as a protection against its being *permanently* soiled by such a peculiarly adhesive powder, was clearly out of the question.

By using a previously albuminized paper, applying the carbon to the surface of the albumen, and then covering it with a coating of the gelatine and bichromate or other light changeable mixture, clear lights are rendered possible; but the unattainableness of half-tones is obvious, rendering such a plan, however successfully carried out, inapplicable to anything but copying of engravings, drawings, woodcuts, writings, and similar objects.

By grinding up the carbon, metallic oxide, or other pigment along with the bichromate and gelatine or gum, and applying this to the albuminized paper, we certainly advance one step further towards what might be expected to give generally useful results. It must be observed that the possibility of producing half-tones by this plan rests on the power of the insolubility causing actinism to penetrate, with *a certain degree of facility*, the mixture of pigment with bichromate and gelatine or gum—the gelatine or gum being in consequence rendered insoluble to a greater or less depth on different parts of the picture according to the varying depth to which the actinism has been allowed or had time to penetrate, this again being dependent on the varying translucency of the different parts of the negative. But to render this action practically available for the obtaining of anything like half-tones by simple water-washing with carbon or pigments insoluble in that fluid, there are these two essential requisites:—*first*, that the mixture of the pigment and bichromate should not be too impermeable to actinism (and for this reason, it would appear that many other substances, particularly blue pigments, as cobalt blue, prussian blue, or indigo, might be more easily workable with the carbon); *second*, that, in printing, the paper should have its unprepared side (and not its prepared side, as in ordinary printing) placed in contact with the negative in the pressure-frame, as it is only by printing in this way that we can expect to be able afterwards to remove, by washing, the unacted-upon portions of the mixture. In a positive of this sort, printed from the front or prepared side, the attainment of half-tones by washing away more or less depth of the mixture, according to the depth to which it has been hardened, is prevented by the insoluble parts being on the surface, and in consequence protecting the soluble part from the action of the water used in washing; so that either nothing is removed, or, by steeping very long, till the inner soluble part is sufficiently softened, the whole depth comes bodily away, leaving the paper white.

In a note which appeared in the Liverpool Photographic Journal of May 15, p. 128, some observations will be found as to my researches

on the possibility of producing pictures with various metallic oxides, and on this same, or so far as this same, principle—these substances (or many of them) having this material difference, as photographic pigments, from carbon, that, instead of our being obliged to trust for our lights and half-tones to the washing away of the soluble gelatine, gum, or albumen, which may be apt to require a degree of rubbing, sponging, or agitation injurious to the finer and more delicate parts of the print, we depend instead, entirely or partially, on the solvent power over the metallic oxide or other pigment exercised by an acid or other fluid which penetrates the different parts of the print more or less readily according to the degree to which the gelatine, gum, or albumen in these different parts of the print has been less or more hardened and rendered impermeable by the action of the actinism coming through the negative.

In working with metallic oxides, and soluble in acids, though the plan of applying the pigment to the surface of the paper and *below*, instead of mixed with the gelatine or gum, is not so thoroughly objectionable as when washing with utterly insoluble substances, as carbon, insoluble green oxide of chrome (for ferns), cobalt blue, &c. &c., provided we protect the back of the paper from the penetration of the solvent by a resinous or other impenetrable varnish—still the grinding-up of the acid-soluble pigment along with the bichromate *or other sensitive salt* and gelatine or gum will be found *the better plan*; and working on this plan, we may solarise under our negative either on the prepared or the plain side of the positive paper.

There is yet another way of applying the pigments—by first filling the pores of the paper with them by double decomposition or other precipitation (many metallic oxides and various salts being precipitable in this way), and then afterwards soaking the paper in the solution of mixed bichromate (or other salt) with gelatine, gum, or other vegetable or animal substance, the precipitate being, as in the last case, more or less easily dissolved-out in proportion to the hardening of the gelatine.

I called attention last year, in "Phot. Notes," to the possibility of substituting the uranic salts for the bichromates, not only for these styles of printing, but also for *photometallography*, photolithography, and their allies. I understand that M. Niepce has extended his uranic rediscoveries to this fact also. They or the ferric salts may, in our oxide-printing, have sometimes the advantage of bichromates, of not dissolving certain oxides which the bichromates may have a tendency to act on.

I have long devoted a good deal of attention to photometallography; and there is one old plan of mine which appears to me to be in some respects simpler than that of Mr. Fox Talbot, and which I must try to get ready a specimen of to send to you, as, though I got quite far enough to show the principle to be correct, I never found time and opportunity to get up any presentable specimens of it. There are also two plans of photometallography on different and new principles altogether, which I have some hopes of getting something available out of.

As gallate-of-iron processes are again attracting a little attention, I may here repeat what I have frequently stated to my photographic friends, that I believe that the action on gelatine and gum, as well as on albumen, may be brought into play very advantageously both in these and in "cuprotype" and allied processes. We may have our paper in the first instance plain or *albuminized* (unsalted), and then float it on the solution of bichromate alone, or of bichromate in mixture with gelatine or gum, or of bichromate with a ferric or cupric salt (a mixed ferric and cupric salt) and gelatine or gum. I am inclined to prefer albuminized paper; and the mixture of gelatine or gum with the sensitizing solution secures a sufficiently thick film, and the presence of a sufficient quantity of the sensitive film on the surface, where it ought to be.

I give the following mixtures of salts for the composition of sensitizing-baths for plain or albuminized papers, to be afterwards developed by gallic acid, tannin, alkaline solution of tannin, or prussiate of potash, or ferrocyanic acid, &c., for the production of ink-prints, cyanotypes, or cuprotypes. They have the recommendation of shortening, by one bath less, ink-printing as described by M. Sella. These processes without gelatine appear well suited for photographic calico-printing.

I. For unalbuminized paper.

1. Bichromate of ammonia.
2. Ammonio-ferric oxalate (plenty of it).
3. (If wished) Ammonia oxalate, sulphate, or other copper salt.

The copper salts here and in the other bath are especially with reference to prussiate-of-potash development (see 'Journal' of August 1857), giving red or neutral-tint prints.

II. For *albuminized* or plain paper.

1. Bichromate of potash.
2. Ferric nitrate*.
3. (If wished) Nitrate of copper.

* The ferric nitrate can be bought ready made in solution, being used medicinally. N.B. In all mixed baths of this nature it is the ferric salt which must be employed. Printing on paper or film prepared by a mixture of bichromates with ferrous sulphate, as an-

III.

1. Bichromate of ammonia (or of soda).
2. *Ferric* sulphate, or *ammoniacal iron-alum.*
3. Sulphate of copper.

The bichromate of ammonia, besides greater sensitiveness, is to be preferred, *when there is any sulphate* in the mixture, to the bichromate of potash. Where a copper salt and a nitrate occur together in the solution, the paper is apt to be rather slow about drying, and to attract moisture; hence I rather avoid the combination.

We may also produce ink-prints, and variously coloured prints, by grinding up Prussian blue with our gelatine and sensitive salt, and, after solarization and washing, blackening or otherwise altering what is left by gallic acid, tannic, copper-salts, or other substances.

The processes with oxides and various pigments, along with bichromates and gelatine, &c., described in the early part of this paper, have great advantages, from the *amount of pigment fixed*, for the purpose of being burnt into porcelain, glass, or enamels.

Old Aberdeen.

Mortar Phantoms.

To the Editor of the Photographic Journal.

Vanbrugh House, Blackheath,
13th Nov. 1858.

Sir,—As many of your readers are now in possession of one or more of those Stereographs called "Mortar Phantoms," and as more than one has expressed to me his disappointment on seeing them for the first time, permit me a word in their defence. Where "Mortar Phantom" happens to be confounded with that cleverly got up illusion, "The Ghost," that sort of disappointment would probably be felt which was once experienced by a little Scotch boy, who, never having dreamt there was any difference between a duck and a duke, found himself one day face to face with the great Duke of Argyle, of whose fame he had heard so much.

The child, after staring at the Duke with open mouth, above, below, and all round, at last exclaimed, "Can ye swum?" (swim).

Phantom and Ghost being kindred terms, it is easy to conceive a mistake arising from a supposed identity. One however is the picture of a fiction; the other the sketch of a fact. If the latter be neither so pleasant a picture nor so well manipulated as the former, the following histogram should not be overlooked by any one wishful to find in a Stereograph other matter than mere amusement.

nounced in a paper read before one of the societies last year, is very nearly impracticable, almost the whole of the iron being precipitated as peroxide, and much of the chromic acid decomposed.

On the 28th of last July, wishing to ascertain whether it were possible to photograph a 13-inch bomb-shell the instant it was shot from the mortar, I had my camera placed in position at half-past 10 A.M., 90 feet behind the centre of the Woolwich Common mortar platform, the 13-inch mortar being almost directly opposite, with three smaller ones on each side.

On a preconcerted signal from the Acting Commandant, the collodion was poured on the plate, inside the camera, bathed for 90 seconds, then posed ready for exposure: but whilst on the look-out for—"Fire!" a soldier was perceived running in haste from the locale of the flag-staff, in the direction of the battery, with a message, which "hung fire" full thirty minutes, during all which precious while my wet collodion plate was growing into a most unwholesome dry one, and would certainly have entirely perished, considering the heat, had I not taken the precaution, on setting up the camera, to cover the bottom inside with water. As it was, the film, on development, was found to be so parched as to have merged the upper terminus of one of the shell's tracks in the indefinite. Nevertheless, regarding the two halves of the picture stereoscopically, the projectile's track was unmistakeably there; but on pointing out this fact in the negative to Serjeant Owen, who was standing by at the time, the glass fell to the ground. "Broken!" exclaimed the Serjeant. It was a common-place accident that slip of the negative; but the cause of that slip was otherwise. It was the phantom, the heliographic *rationale* of which may by the earnest reader be found in the first chapter of a very old book, but not that one from which, Mr. Editor, you so appositely in the September 'Journal' quoted "the grand sentence of Plato ("——".

If there be "nothing new under the sun," then was the most renowned of Egyptian fire-worshippers a consummate heliographist. He who not disposed to admit this, has, by my letters in the *Times*, been tempted to forward stamps for a "Mortar Phantom," shall have the stamps returned on returning the phantom, which has not been advertised for sale, otherwise than as proof of the capabilities of a camera to interpret some of nature's hitherto impenetrable secrets.

Should a brief account of the circumstances under which No. 3, the last of the monsters, Mortar Phantoms, was taken, I shall be happy to forward it. In conclusion, permit me to add that the negative No. 1, in falling to the ground, was uninjured, save by a moderate scratch on the back of the left phantom's neck.

Thomas Skaife.

A New Process.

To the Editor of the Photographic Journal.

Aix-la-Chapelle, Nov. 10, 1858.

SIR,—Herewith I forward you a photograph on glass that I succeeded in obtaining in the year 1856, in the following manner:—

A plate was coated with asphalt varnish, known in this country under the name of "Eisenlack," diluted with rectified benzole or benzine (first product obtained by distillation of coal-tar at a low heat), and when barely dry, and still slightly sticky, was placed in contact in the pressure-frame with a negative on albumen, and exposed to the direct rays of the sun for one half-hour. On removal from the pressure-frame the plate was breathed on over its whole surface until the image became distinctly visible, those parts changed by the action of light absorbing moisture, and those covered by the blacks of the negative remaining unchanged and repelling it; in this state, the image being distinctly visible, it was quickly covered with the bronze powder known as aurum musivum, which at once changed the almost invisible image to a direct positive in black and gold; the gold adhering to the parts that had been protected from the light, and not adhering to those parts where the actinic rays had produced such change in the molecular structure of the film as rendered them capable of absorbing moisture, thus producing a complete picture detailed in all its parts. In the sample I forward (view of the cathedral at Cologne), the tracery of the Gothic windows, and the iron rails in front of the church, are distinctly visible. I at once saw that this process might be very valuable, as the same coating could be obtained on metal plates, lithographic stones, &c., and that fine carbon (printers' ink?) might be made to adhere as well as the aurum musivum, and that the plates could also be treated by galvanism. My professional duties and other matters prevented me, however, making further trials; and I had almost forgotten the matter, until the last Journal I received containing Mr. Fox Talbot's process, and observations by Mr. Malone on M. Poitevin's, brought it to my mind; and I determined at once on sending you the enclosed sample, which is the first and original plate obtained in 1856. It has suffered much from laying about; but I shall be most happy, when my other occupations admit of it, to prepare and send you better samples and give any further explanations you may desire. The Eisenlack is prepared here as follows:—176 lbs. of asphalt are melted in a pear-shaped iron vessel over a charcoal fire, and, when liquid, 279 lbs. of oil of turpentine and 16 lbs. of well-boiled linseed oil, well heated, are added to the dissolved asphalt, which has in the meantime been let cool down as far as possible without becoming solid. The whole is then incorporated, and heated until perfectly liquid; when cold it has the consistency of thick treacle. This varnish, diluted with benzine, is what I employ; its consistency must be such that it flows smoothly and equally over the plate, and leaves a film, seen by transparency, of the colour of dark amber. The plate must be slightly warmed, but very slightly, and of course dried in the dark. I was not able to obtain any good results with M. Nièpce de St. Victor's varnish or process in the washing off: either the whole print went, or a blotchy thing remained, difficult to recognize as a photograph. I am far from saying that the varnish I used is the best that can be found, but until a better is discovered, it answers the purpose very well: the older the varnish is the greater is the sensibility. Linseed, nut, and poppy-oil, &c., as is well known, when exposed to the air in thin layers, become at last a sort of jelly, and it is found that they have absorbed large quantities of oxygen: they may be brought to the same state in a much shorter time by boiling, and the cautious addition, drop by drop, of nitric acid when on the fire. All these oils, when dissolved in a suitable vehicle, and some body, such as asphalt, lamp-black, zinc oxide, &c., added to give them body, are photographic agents, and give a representation of any body that partially hides the light from them. Any of your readers will find, if they fix one of their negatives on a freshly-varnished door, that, on removal at the expiration of a day or two, or longer, as chance may have it, and the light is strong or weak, &c., that on breathing on the spot, there is an otherwise invisible copy of their negative hidden there.

I hope this communication may prove the means of inducing others to make further experiments in this branch of photography.

R. M. GRIER.

[The specimen which M. Grier has sent is placed in the Reading Room for the inspection of Members. It will be seen to possess great novelty, and is well worthy of their attentive inspection.—ED.]

ANSWERS TO CORRESPONDENTS.

J. C.—The admission-fee to the Society is One Guinea, and the annual subscription the same; but members elected now, pay but half-a-guinea until the 1st of February, the period when the annual subscriptions become due; consequently a member elected at the present date has the right of admission during the month of January to the Exhibition, and privilege of introducing one friend also.

Ralph Winwood.—Throw aside all your former formulæ, and use the following, which is less expensive, and gives the best toning bath with which we are acquainted; it is simple and efficacious:—

Chloride of gold	1 grain.
Water	12 ounces.
Carbonate of soda	60 grains.
Citric acid	20 grains.

After the effervescence has subsided, warm it until a slight discoloration takes place, which you will find to be at about 110° Fahr. Previous to immersion in this bath, wash your proof for the free nitrate in water, and if your picture is a little over-printed it is advantageous. Place the picture in this solution for a short time, in fact, until you are satisfied with its tone; then take it out and wash it in plain water, and immerse it immediately in hypo, 1 pound of which is dissolved in 3 pints of water, and ½ an ounce of carbonate of soda added. All the actions are very rapid; and if afterwards the hypo is thoroughly removed by washing, we believe you will obtain a picture which will neither turn yellow nor fade, if you use it as has been described in a late Number.

T. L. B. (Chudleigh Green).—Your experience exactly coincides with our own, and we do not see any advantage whatever in removing the size from a picture. The hypo may be perfectly removed without damaging the texture of the paper. For many years we have maintained that, to ensure permanency, a picture should be ironed, and with as hot an iron as will not damage the paper. About eight years since Mr. Blowers of Costessy near Norwich, pointed out to us the advantages of heat; and when *properly* applied we have never seen it fail.

Perseverance.—1. There is no objection to your immersing a picture in a solution for development, except from waste of material. Pour your solution on gently and in a corner of the plate; often the spot where the developer is applied is transparent: it is avoided sometimes by using a very weak and an acid developer. 2. Use a smaller stop to your lens, and give longer exposure; the defects would indicate an insufficiency of light, and that light, too, diffused. Use at least 20 drops of glacial acetic acid to the ounce; omit the alcohol, which is useless; and should you operate in cold weather, use your developer warm, at any rate not less than at a temperature of 70°.

A Constant Reader (Barnstable).—A portrait lens never acts so well as a landscape one for taking views. We have not ourselves been successful in reversing the first lens for such purposes. From the experience of others, it would seem that Mr. Ross's new combination possesses both advantages.

Mr. P. W. Fry has kindly referred us to pages 111 and 135 of Volume I. of this Journal, from which it appears that Mr. Furlong, and *not* Sir David Brewster is entitled to the merit of the discovery of the double iodide in the calotype process.

Barnard S. Procter.—If you make a request to Mr. Ross of Featherstone Buildings, no doubt, from his great practical knowledge, he will furnish you with the requisites.

No. 35.—In attempting to answer your queries we find it impossible, from the length of space it would require; in fact, it would form a condensed treatise on Photography. Your cheapest plan, if you wish to succeed, is to take a course of *practical instruction.*

Mr. Lyndon Smith.—We shall feel obliged for an impression of "The Grave-yard" for our Reading-room.

J. Glover.—We quite agree with you in sympathising with the loss which Mr. Sutton has sustained; and, acting up to our belief that photography is the "Free-masonry of the Sunbeam," shall be happy, by every means in our power, to promote any proposed subscriptions from our brethren for remedying his unavoidable loss.

A. J. (Edinburgh.)—The present Editor does not hold himself responsible for the observations of his predecessors. Our present Number, however, contains an article on the subject referred to. If the *advertised* process is a desirable one, no doubt before this it must have been communicated to the photographic public.

H. N. K.—The Rules of the Society are at present out of print, but they occur in the first volume of the Journal.

G. N. (Thorney Hall.)—Thanks for your paper, which shall appear in our next. The large picture is beautiful.

T. M. (Whitby.)—We were quite aware of what you state; but the stereoscopic spectacles are decidedly good, and ought to be known.

William M'Craw.—Your communication arrived so late that we must notice it in our next.

W. E. D.—Formerly we advocated the use of Sel d'or; but it is expensive, and more satisfactory results are otherwise obtained. See answer to Ralph Winwood.

We have received a very interesting work, "Visits to Madagascar," by the Rev. William Ellis, author of "Polynesian Researches," illustrated by woodcuts from photographs: we intend to give a notice of this in our next.

E. B. (Sloane Street).—1. The bath should be neutral. 2. After the addition it becomes acid. 3. The use of acetic acid to the toning-bath, as formerly recommended, is now discontinued, other researches having devised better means of procuring beautiful results.

G. W. H.—We have always been most successful with a pair of lenses.

J. H. S. (Slade Aston).—No harm can arise to a bath by such exposure as you mention. Discontinue the glycyrrhizine.

A Correspondent has requested the Editor to recommend him "for employment a respectable conscientious person, who is a *good* photographer."

Francis E. Eliot.—Several inquiries have been addressed to us, asking where the "alcoholic collodion," as described by yourself in a late Number of the Journal, can be procured. Not knowing your residence, this is our only means of communication.

W. D. (Gray's-Inn).—An advertisement would be your proper course. The colouring of photographs is very remunerative.

J. M. S. B. (Staplehurst) writes to complain of the absurdity of noticing Mr. John Sang's supposed discovery, and facetiously recommends him to practise on the flat surface of the "Times."

Communications received from. — H. F. Talbot; C. G. H. Kinnear; R. C. P. Cleaver; Rev. W. Lee; W. Elliott; C. J. Burnett; N. Ennel; T. Ottewill; Mr. W. Russell Sedgefield.

*** In the report of Mr. Shadbolt's observations at the last Ordinary Meeting, we regret that some inaccuracies have taken place, which give an erroneous idea as to that gentleman's meaning. Wherever it can be done, a proof should be corrected by the speaker, and thus ensure an accuracy which can otherwise scarcely be expected.

All Communications for the Journal should be addressed to the Editor, at the Publishers, Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street, E.C.

THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 74. DECEMBER 11, 1858.

On reference to our report of the proceedings of the meeting of Tuesday last, the Members must all feel pleased at the increased attractions afforded them at their ordinary assemblies. Thanks are offered to those who have so kindly aided to make these meetings gatherings to exhibit the actual progress made from time to time in the advance of the art; and we trust that that which is now so favourably commenced may be supported as freely by contributions in future. The Secretary will use his best exertions that every care shall be taken of pictures or objects of photographic interest entrusted to him for the Society's use.

As was stated in our last, Mr. Robert Howlett had promised to attend and exhibit the negatives from which Mr. De la Rue's wonderful pictures of the Moon were taken. Death, however, has removed him from amongst us, after a very short illness. Mr. Howlett was beloved by all who knew him, and the announcement of our loss from the Chairman was received with deep regret.

Endeavours have been made from time to time, by Members of the Society, to organize a system of exchange of photographs. The subject has been several times brought before the Council, and a Committee was appointed last summer, one of whose duties was to arrange a plan for carrying out this object. Without going so far as to say that it is not possible to form a plan which shall work satisfactorily, it is enough to state that no progress has hitherto been made towards such a result.

It is very desirable that the Members of the Society should have occasionally laid before them visible evidence of the progress which the photographic art is making. Other societies have purchased, and presented to their members, copies of successful photographs produced by artists of established reputation.

There are obvious objections to the adoption of *such* a course by the Council of the Photographic Society of London. Some of its Members, however, together with other gentlemen belonging to the Society, have offered to contribute each a certain number of copies of their best negatives, in order that the Society may present to *every Member*, whose name shall be included in the list of the year 1859, a good specimen of the present state of the art.

Mr. Bedford, Mr. Fenton, Mr. Delamotte, Mr. White, and Dr. Diamond have already pledged themselves to furnish 50 prints each. Mr. Frith and Mr. Thurston Thompson, we have heard, approve of the plan and will assist us. Mr. Rosling will be induced to favour us with specimens of his beautiful pictures now exhibited at the Crystal Palace; and Mr. Llewellyn some contributions from his portfolio, which all photographers are so desirous of possessing. Members may also expect to be favoured from Mr. W. B. Turner, whose choice specimens of calotype will be remembered by all who have visited our exhibitions. In fact, we believe that among the many *good* photographers who are members of this Society, there are few who will not be pleased to give their zealous assistance. All those who are willing to cooperate in carrying out this plan, *already announced*, either by the loan of negatives, or the gift of a number of positive prints, are invited to communicate with the Secretary of the Society.

Since the meeting on Tuesday last, Mr. Pouncey has kindly demonstrated, by actual manipulation, the facility with which his carbon printing process may be performed. We fairly believe it to be one deserving of every attention; and Mr. Pouncey having entirely abandoned all idea of proceeding with obtaining a patent, we hope that the proposed subscription-list will forthwith be completed, so that he may be relieved from the unwilling reserve under which he is now placed,—from the course which has been taken in the for-

mation of that subscription, to which, in our opinion, he is justly entitled.

In a late Number we cautioned our readers as to using due caution in the transmission of postage stamps in reply to advertisements in our columns, we fear that in some instances that caution has acted injuriously to highly honourable and deserving persons, and therefore we think it right to state that the instances referred to were in the advertisements of secret formulæ and of a photographic trivial publication, which, in two instances to our knowledge, was not forwarded after several applications were made.

Often the transmission of stamps is the only way in which an artist can be remunerated for his productions: thus, the other day we were enabled to possess ourselves of three stereoscopic views published by Mr. Easter, of Grantham,—of the Birthplace of Sir Isaac Newton; the Grammar School at which he was educated; and his Statue recently erected at Grantham.

> "Nature and Nature's laws lay hid in night;
> God said, 'Let Newton be,' and all was light."
> *Pope.*

How pleasing would it be to see such pictures as these in the collections now generally found in our homes, instead of the multitudinous trashy productions that are so prevalent! In mentioning the above, we would wish, if possible, to give a wider notice of the exquisite interiors of our Cathedrals, which Mr. Sedgfield exhibited at our late meeting.

We hope our friends are not forgetful that the day is near at hand for the reception of the pictures intended to be sent to the Exhibition in Suffolk Street, and which will open the first week in January.

PHOTOGRAPHIC SOCIETY.

Ordinary General Meeting.

December 7, 1858.

Roger Fenton, Esq., in the Chair.

The Secretary read the minutes of the last Meeting, which were confirmed.

The Chairman announced the following names, as recommended by the Council for election upon the change of Officers, by rotation.

As Vice-Presidents:—Mr. Peter Le Neve Foster and Mr. Vignoles, F.R.S., in the place of Dr. Percy and Dr. Diamond.

As New Council:—Mr. Mackinlay, F. S. C., Mr. Thurston Thompson, Mr. White, and Mr. Harding, in the place of Mr. Anthony, Mr. Shadbolt, Mr. Malone, and Sir George Clerk; and they recommend that Mr. Maskelyne, who also retires, be re-elected.

A member requested to be informed of the particular rule under which this nomination was made, and the Chairman having read the rule, further observed that he was about to call the attention of the Society to a circumstance which they must all deplore, viz., the death of Mr. Robert Howlett. He said:—"We are not so well acquainted with his face, perhaps, as we should be, owing to his retiring habits and modesty of demeanour. I am sure the Society will not allow his memory to pass away from us without our testimony to his merits."

The following gentlemen were then balloted for and elected members:—

C. J. Hughes, Esq.; Major Wingate; Robert Cradock Nichols, Esq., F.S.A.; J. S. Rockstro, Esq.; Frederick Gush, Esq.; Algernon Sidney Bicknell, Esq.; George Carl Backes, Esq.; The Rev. C. P. Cleaver; H. J. Cannon, Esq.; W. J. Bull, Esq.; Edward Dwyer, Esq.

Mr. M'Craw, of Edinburgh, exhibited some specimens of his mode of printing without silver; Mr. Hardwich a series of stereoscopic views of interiors, photographed and published by Mr. R. Sedgfield; Mr. Elliot, of Peckham, specimens of pictures taken with his alcoholic collodion. The Secretary exhibited some beautiful views of the Castle of Heidelberg, taken by his friend Mr. Carl Backes: also some pictures lately produced with Mr. Ross's new orthoscopic lens by the late Mr. Howlett. Some very beautiful and interesting positives on glass, done by the Fothergill process by Mr. Hesseltine, were also on the table, together with a handsome donation from Mr. Fenton to the Society of pictures lately taken by him, and which mark the perfection to which the photographic art has now arrived.

Mr. Pouncey was then introduced to the meeting to read a Paper upon Carbon Printing, and said:—

Mr. Chairman and Gentlemen,—I will tell you how I came in possession of this printing; I will be as brief as possible. If I seem a little excited on the subject, I must beg your forbearance, because it is one that I am very much attached to. On my arrival here in London the last time, I could not understand the manner in which I was received. I ask, would Mr. Fox Talbot like to put his early impressions by the side of the impressions of this day? I have in my possession some of his early ones. I got one from the Athenæum of 1853. I come to the allegation that there is another process wanted. Here is a book I hold in my hand published five years later, and I maintain that it is difficult for any one to prove that these early photographs ever were as good as photographs are now. I am prepared to prove that my specimens of carbon printing are superior to Mr. Fox Talbot's early impressions, and I will turn out any number of them superior to his early impressions. I am now prepared satisfactorily

to prove by these specimens that all the detail, the half-tones, and everything else that can be required in a photograph is exhibited here, and if I had only produced one specimen, it was a sufficient proof of the capability of the process, and, if it had never gone farther than the reproduction of prints, it would have been invaluable in that respect, and it is a simple process. This print I hold in my hand was produced by a man on Friday last who had never seen nor had anything to do in the least with photography. I put a paper of instructions into his hand and said, "See what you can do with that." Now, I put that to the meeting and ask, is not that a clear proof that it is workable by any man who has common sense. The carbon is not peculiar to me, but it is applicable to anything and everything. Here is a letter I received from Mr. Rogers, who said, "I prepare a very peculiar kind of carbon which will transfer printing." I then received a piece, about as much as a pinch of snuff in paper.

The CHAIRMAN read a small piece of print which had been handed to him by Mr. Pouncey.—"Mr. Rogers, Dec. 3, 1858. This I printed this day with the carbon received in your last, exposed 20 minutes, no sun and bad light;" and then read another similar paper.

Mr. POUNCEY.—I think that this is a proof that it is not confined to me or to any particular carbon, because this gentleman incloses what he has done for the first time. I suppose it is not necessary for me to prove that the prints are permanent, if so, I am willing to submit them to any test, and I will guarantee that you cannot destroy them by any means. Then you will say, "Can you produce all the tones and half-tones, and everything that is requisite in photography?" In answer to that I ask, are not these specimens everything that can be desired? I have no hesitation in telling you what I think the secret of success depends upon. Here is a piece of paper prepared, I believe, to absorb moisture, the solution being absorbed into the face of the paper and not on the paper, and if you will examine these two little bits, there is scarcely anything on the face, because it will be evident to all, that if there was a thick coating on the face, the light could not do its work equally over, but if this paper absorbs it, the light penetrates it and hardens the colouring matter, the other remaining soft when it goes to the water, and there is nothing left in the print by any means that can by any possibility hereafter affect the permanency. After the print is finished, it contains nothing but carbon and paper. I know there are a number of photographers about London who think it all a hoax. I should say to those gentlemen, if they do not know better, they ought to know.

The CHAIRMAN.—Personal questions are not to be discussed here.

Mr. POUNCEY.—Well Sir, but am not I a personalty? I only want a plain straightforward way of explaining this matter, and if I am not personal, I cannot give an answer. I was told by this gentlemen then, that if I could produce copies by carbon equal to silver, I should have the credit of one of the greatest discoveries photography has ever known (Cries of Yes, Yes). Then, have I done so?

Mr. MALONE.—That is the question.

Mr. POUNCEY.—Is it not so?

Mr. MALONE.—Meet that question.

Mr. POUNCEY.—I meet it with the specimens before the meeting now; therefore I meet it by submitting certain resolutions.

Mr. MALONE.—Sir, I rise to order. This is not the time for resolutions. I brought the subject before the last meeting; when Mr. Pouncey came before the meeting on the last occasion, he certainly was met in an equivocal manner, I did my best then to support him; I said we ought to treat him fairly. It was not because he was likely to be a patentee that we should put him down. Mr. Pouncey has been kind enough to come here with a paper, and I come prepared with specimens; I gave way to Mr. Pouncey in order that he might read the paper, and I think we ought to treat him with some little indulgence; and I would suggest that he should read the paper he intended instead of his temporary address, which he follows with resolutions. I do not want to interfere with or stop him, for I take great interest in the matter. If it is a secret, let him say at once, "I will tell you up to a certain point, but beyond that I retain the secret."

Mr. POUNCEY.—I have not come to read a paper, Sir, I have never given any notice to the meeting that I shall read a paper.

Mr. MALONE.—Then I have some remarks to make when you have finished.

Mr. POUNCEY.—Then make your remarks at once, I shall be very glad to hear you. I met Dr. Diamond to-day, and was prepared to turn out a print in his presence, and have promised to do so on Thursday. I am willing to demonstrate it before any credible witness.

Mr. MALONE.—Perhaps Mr. Pouncey will forget this little excitement of the moment, and favour us with his description. We are not met here to-night to receive an account of the treatment he has received from other Journals or from the Society, because this is not the time.

Mr. POUNCEY.—Then, apart from any feeling, I have shown you a piece of paper prepared. I say that none but myself can prepare a piece of paper prepared like this; and I am prepared to demonstrate it in the presence of any credible witness.

Mr. WATSON.—Will Mr. Pouncey tell us how that paper is prepared?

Mr. POUNCEY.—No; I cannot answer that now.

Mr. BISHOP.—Perhaps Mr. Pouncey's object is to acquire information by which he may be able to perfect his patent.

Mr. POUNCEY.—I beg pardon, Sir, that is not so.

A MEMBER.—I think Mr. Pouncey has decided that he will not proceed with his patent.

Mr. POUNCEY.—Certainly not. I told you at the last meeting I did not desire to get a patent.

Mr. MALONE.—Although we are all irregular, it is perhaps the time to ask point blank whether Mr. Pouncey has received a certain number of pounds sterling to communicate this process; perhaps it is fair to ask him whether he is in receipt of that sum—I think it is £100; and I then ask him whether we shall have it communicated this evening, or when?

Mr. POUNCEY.—I do not think you can ask that here, and I do not think you have a right to ask it.

Mr. MALONE.—It is very evident that Mr. Pouncey is trying to make some use of this Society. The object of this Society is to promulgate new processes and discoveries in photography, and I deprecate the time being frittered away thus. I have no paper to read, but merely to submit some specimens, which you can examine and compare with Mr. Pouncey's process, or with Mr. Talbot's, or with Messrs. Lerebour or Veso's. I hold here now some specimens which I made myself, and some which were made in Paris; in short, I have brought a sort of *résumé* of the whole subject of the former and the present state of the art, and its future prospects, and trust in these few remarks you will treat me with indulgence. We have lost so much time to-night that I cannot venture to go into a history of these engraving processes, but I will endeavour, in as few sentences as possible, even now to give some account of the beginning and progress of this art of printing in carbon, which is a general term. Carbon being a non-metallic substance, differs most essentially

from metallic substances, so that there is one broad basis of distinction between the two processes of printing.

In going back to the first engraving process, I may remark that it is very remarkable that we are now taking great interest in engraving processes, and perhaps many of us forgetting that the carbon-printing was the very first process in photography; the plates printed by M. Niépce by bitumen poured on those plates are still in existence, perfectly permanent. There was a copy of an engraving obtained by the action of photography, and then afterwards etched by acid, and there we had line by line; therefore the oldest specimen of photography is by Niépce, twenty years before we knew anything of Daguerre's or Fox Talbot's process. Now Niépce took a plate of silver, or a plate of anything, and put upon that plate a varnish called Jew's pitch, which is a very indefinite substance. You find, by experiment, the sample of bitumen most sensitive to light; dissolve it in ether or some other solvent—in this case oil of lavender; you then put it upon the plate by any convenient means, then coat it with black varnish in the dark. Upon now placing the engraving, or an object—for simplicity a piece of grass —and exposing it to the sunlight, the light acts in such a manner on the bitumen as to harden it; then apply mineral naphtha, and you can dissolve away the unhardened parts, the hardened parts resisting the action of the solvent for a time, for eventually you can dissolve the whole. Now that simple principle, which gave us the first photographic engraving, runs through the whole processes down to the present day—that hardening a part, hardening to a certain extent the intermediate part, and dissolving the rest. The difficulty was to get the bitumen uniform. Niépce himself, by dint of long exposure in the camera, did succeed in so altering the bitumen as to get a picture by the action of the camera. I shall be glad afterwards to ask Mr. Pouncey if his process succeeds in the camera. The process of Niépce was too slow for actual purposes. The picture he obtained in the camera was a most marvellous result; it is much to be regretted that it is not in some public exhibition; I borrowed it once. This specimen really, to my astonishment, resembled a faint ordinary daguerreotype; the part acted upon by the light gave a direct positive image which was astonishing; and Niépce thus gave us a faint picture which I looked at some ten or twenty years afterwards, and I have no doubt that positive picture will remain for ever if kept only in an ordinary atmosphere. It is in the British Museum; and if there is any person here having any power with the Museum people, he may get it properly preserved, for Sir Robert Brown told me that the Museum people were exceedingly indifferent about it. I hope in the present day no excuse will be admitted, but that these specimens will be secured and placed in proper hands. So much for M. Niépce's invention. That has been taken up by Niépce St. Victor; and certainly very pleasing things have been produced, but still coated with bitumen acted upon by acid. But this bitumen has been further applied; it has been applied to a lithographic stone, in such a way that, after the light had acted, the stone should be bared in certain parts by the solvent, and the stone be moistened with water; then the other parts could be attacked with a greasy roller, and then printed in the way of an ordinary lithograph. But it can go further than this: you could take the stone which had been laid down, and you could treat with soap which would enter the stone; you could then afterwards remove the blackened varnish by stearic acid. If you left the soap upon the stone, which is a watery solution, and then used the solvent, which is not of a watery nature, but of a resinous nature, you could get the lines in the soapy substance; thus, by ingenuity, you could apply the ink either to the blackened varnish or the soap. Then we get a considerable step by these processes. Then you may ask, what has become of this process of engraving by steel plates? There are difficulties inherent in all these processes, as we shall find. They will not bear comparison with prints by silver. I say it fearlessly, in Mr. Pouncey's presence, they will not bear comparison with pictures by silver. I say these prints are very beautiful and full of promise, but they are not equal to those by silver. With regard to these processes, (not to digress,) these bitumen processes are still capable of producing good things in skilful hands, and it is again, as Mr. Talbot tells us, that tact and dexterity, which every one does not possess, are necessary.

Now, about the time that the daguerreotype came out in 1839, many attempts were made to etch the daguerreotype plates. Having a photograph upon a plate of silver by a deposit, it was believed, of mercury, (which we took for granted,) or an amalgam, it was at once seen that an acid might act differently upon the pure silver, and that action which it might have upon the amalgam; and accordingly the common aquafortis was tried, and it was found that it attacked the silver in preference to the lights; then it was seen at once, by faintly etching the lighter parts, you obtained a plate. *Here* is a faint thing of the daguerreotype surface in the shadows; the light parts are white: a very weak impression could be taken from that plate, and, of course, a very few impressions. Then followed M. Veso, Dr. Berryer of Vienna, and another gentleman whose name I cannot now recollect. Then we come to experiments in this country for the same purpose.

It occurred to Mr. Grove, that, if he could dissolve muriatic acid by means of a galvanic battery, the chlorine would seize the plate, and that it would be more under control than the nitric acid. In this way Mr. Grove etched very beautifully several plates very faintly. Then, after that, M. Veso of Paris experimented upon these daguerreotype plates, and he found by treating them with a mixture of common salt he could etch the silver part. But he found something more important; he found that the amalgam could be acted upon by heat in such a way as to spread itself so that he could get rid of that under-biting; perhaps it may be that he used a strong solution of caustic potash. Whatever the philosophy may be, he was able to etch plates to a greater depth than any one else. I here exhibit a plate of some coins, which are very beautiful. Then M. Veso's process could be got to yield further impressions by electrotyping matrices. Originally that was done; I worked at it myself. It was used in Paris for exhibiting the blood-globules—therefore an important process. Having given you this general glance at Veso's process, we pass on, and come to the more modern processes—bichromate of potash and gelatine; and now let us see to what the various steps in this discovery are due, and I trust I am not a partisan in this question. First of all, Mr. Mungo Powton used bichromate of potash on gelatinous paper; treating it with water, and washing out the unchanged parts, the chromic acid was liberated, and it altered the gelatine: that was not better than the silver prints, and therefore that was left alone. After Mr. Powton, M. Edmund Becquerel made a variety of experiments, and developed the principle still further. Then Mr. Talbot came into the field of experiment, and, as we may fairly say, worked hard, and has earned and deserved much of our esteem. Every process he has touched he has advanced. Mr. Talbot set to work to apply it in a totally different manner: these early experiments were not with a view to produce engravings: he found he could harden enough surface of a metal plate, this gelatine, in fact, doing the work of the bitumen. Mr. Talbot then opened his im-

portant idea to us, and he made experiments with those pieces of grass and lace in the same way: he washed it in water to remove the gelatine, just in the same way as Niépce removed the bitumen; but they would not bear the comparison, for the half-tints of Veso were better than Talbot's. Now I may just observe that about the same time, singularly enough, two other gentlemen were engaged successfully with this bichromate and gelatine, and similar substances—because I make no distinction between white-of-egg albumen and gelatine when treating with bichromate of potash. Herr Pretsch, of Vienna, has shown that you can get remarkable things. There is not a touch upon *this* I produce which can be examined by a lens. I need not go into detail about this process of Pretsch: you will remember he acted upon a different principle to Niépce or Talbot; he found that when he had dissolved it away partially he had got a mould, and into this gelatine mould he could pour a material and get a matrix of that mould, and then from this matrix of wax, by the electrotype process he deposited solid copper on this wax, and thus had a plate from which those beautiful things have been printed. Then, of how far that process has been carried out it does not become me to speak, but I suppose all these processes are capable of being brought into the market; they would, but I suppose there is some little difficulty. In all these processes it is as well to let the engraver touch them, because it will save him a great deal of drudgery, and the stone can be touched with crayon. I am very sorry we have not at this moment the benefit of some one of these processes, as far as they have gone. I am not for waiting until they are perfect; let us have them as far as they are perfected, and do without the engraver if it must be. I must now come to M. Poitevin, who is working in the direction of Lemercier, the noted lithographic printer of Paris: he is working on stone, and it is for us to consider how far a simple process like that may be more acceptable than any engraving process upon plates. I have seen a stone exposed in the garden of M. Poitevin, in Paris. It was exposed upon a stone that was perfectly colourless; it might have been white of egg and bichromate of potash. I observe that he keeps the secret to himself. Mr. Pouncey exposes his picture twenty minutes, and that is a suspicious circumstance.

Mr. Pouncey.—Allow me to say, that those specimens in the room were produced in $3\frac{1}{2}$ minutes.

Mr. Malone.—But these were not in a good light. The light alters this albumen, gum, or whatever it may be. Dr. Franklin thinks that a resinous body is formed by the oxidation of this substance, and it is this resinous substance which enables us to apply the ink, or prevents us washing away the surface where the light has acted. At all events, the parts resisted the water, and that is an important thing in the lithographic process. You will bear in mind, that the process which requires you to put a positive on the stone is a disadvantage for the negative, because there is the double process. In a few words, you put a photograph upon the stone. You expose it and treat it in a certain manner, and take off direct from that stone; and such process of course has great simplicity to recommend it, and if the result is satisfactory to you in comparison with others, you will give it your attention. Now, as to the permanency, it will not become me to touch upon Mr. Pouncey's process; but I say it is a commercial question how far it will be worth while to put some subject into the hands of a lithographic engraver to finish up. Now we come to Mr. Pouncey's process, of which I know nothing except what has appeared in the various journals. This Society has been censured, and especially a section of it, the Printing Committee, of which I had the honour of being a member. We have been censured for not taking up Mr. Pouncey's process. There stands Mr. Pouncey, and I leave it to you to say whether he is the sort of gentleman that we are to be censured for in consequence of not immediately rushing into his arms, when he will not tell us his process. But, however, we will let that pass; we are quite able to bear it. I may observe that this gentleman came here that evening, and he relates very graphically the reception he received. I am sorry for that. I am sure I did my best to support him. At that time it was his secret, and I said he had a perfect right to keep it. I did not expect to learn much from him, and I am not disappointed. I saw his specimens, and it occurred to me that his process was in all likelihood founded upon this very action of bichromate of potash, as it turned out to be. We guessed the thing, and we were not willing to pay £100 for that which we knew. Mr. Pouncey has since improved his specimens, and that has altered his position. I will do him the justice to say they are better.

Mr. Pouncey.—I do not want to sell it.

Mr. Malone.—Then, as you have allowed others to use your name, you should disavow it. This gentleman brought these specimens, which might be either a solution of bitumen in etherial or other solvent. Mr. Pouncey says they are simply carbon held in the paper. Mr. Pouncey cannot prove that. Where is the resinous substance, or the tannin, as it is called? How does he prove that it will not break? I ask him in the presence of any chemist present.

Mr. Pouncey.—I do it upon the authority of M. Gérard of Paris, and that is the testimony.

Mr. Malone.—There is the cement then after it. He has answered the question fairly enough. He says they are carbon. I do not doubt it for a moment. We do not doubt that there is carbon; but the point you have to prove is, that the prints when made are as permanent as those photo-lithographs. Then, next, is the photo-lithograph or is the carbon print the better representative of the negative? We have no portraits here, but architectural subjects, which are not fair tests.

Mr. Pouncey.—Everything is there that is produced in silver.

Mr. Malone.—I took down your words: you said there is the same amount of detail and half-tone, and you submitted some specimens; but do you still observe that there is the same amount of half-tone?

Mr. Pouncey.—I am prepared to prove that now.

Mr. Malone [examining two pictures].—What is this? Is this a photograph and this a carbon?

Mr. Pouncey.—The gentleman does not know one from the other.

Mr. Malone.—I will take your description, and not trust my own judgment. I believe that both these are ordinary photographs. I do not believe that either of them are carbon prints. Will you let me take these away and test them chemically?

Mr. Pouncey.—Yes, in the presence of any credible witness—not otherwise.

Mr. Malone.—I say fearlessly that if those two are shown as specimens, the one by carbon and the other by silver, I say that carbon is a very beautiful result; but do not let us be told that we must immediately say that this is the best process after all, and that we must at once give up silver printing. Let Mr. Pouncey bring it a step further, and then we shall be able to avail ourselves of his process. It has been said that silver prints will not last, but I have some specimens here, taken in 1844, not toned with gold, kept in a careless manner; therefore, I say, if they are unaltered from the very first days of Photography to the present, I for one willingly admit that defective manipulation has to do with the fading. I, for one, should hail a carbon process; but until that process has proved itself equal to the

other, and proved itself equally valuable, we must wait. In admitting that 80 out of 100 silver pictures have faded, I say that if we have 20 per cent. of silver pictures year after year unfaded in a common portfolio, I say, in the ordinary sense, silver prints are not fading. There is a set in the library of the London Institution, the majority of which are unaltered, and as fresh and as vigorous as if they were made a month ago, and in the face of that I never will admit that the silver prints inherently fade. Take the books published by Longman, and I say you will find prints made in 1844 as fresh as possible, and we are now in 1858.

Mr. Ennel.—I have tried this process without a capsule; and after the effervescence had ceased, there was still the undissolved carbonate of soda. Then I took common washing soda and common citric acid and also common water, and I have not experienced any of the precipitate Mr. Hardwich mentioned; I have also used albuminized paper and plain paper. I am convinced that the solution must be alkaline, because it was not citric acid that was left undissolved, but carbonate of soda.

Mr. Hardwich.—The solution must be alkaline. I only believe that the use of the citric acid is an improvement.

A Member.—Sir, I think that there are three advantages attending the process of printing introduced to us this evening by Mr. Pouncey, which have not received the attention they deserve. The first is, that they are able to print from ordinary negatives,—that you have not to go through a great many processes, transferring to stone and otherwise. Another is the superior permanency of the prints; for notwithstanding what has been said this evening, I feel assured Mr. Malone will agree that they are permanent after the decided tests, applied by Garrard and others, of nitric acid. Then I think there is a third advantage, and that is the comparative facility with which the prints can be taken off the negative. The thing is simply done with carbon and bichromate of potash. At the same time, I cannot agree with Mr. Pouncey in saying that the only thing left in the paper is carbon; there must be something besides carbon; there must be sesquioxide of chromium left in the paper. With respect to the questions of half-tint, I think the specimens carried round this evening prove there is a difference; at the same time it is so small that it would be highly advantageous for all of us, as members of the Society, to bring this process to perfection; and whether Mr. Pouncey be the man or not which the Printing Committee adopt, I do not know. Let us give Mr. Pouncey his fair trial; for if he is correct, there is nothing which can compete with him; for, after all, the transferring to plate or stone is an objection which is insurmountable.

Mr. Bentley.—We have, as I am told, a few thousand copper- and steel-plate printers in London. Mr. Fox Talbot was six or eight years perfecting his process. When he first introduced it, a person, whose name I forget at the moment, believing there was an end to copper-printing, and that engraving was for ever annihilated, gave another man a few hundred pounds to take his business off his hands, and engaged a large house with a number of windows in Kentish Town (which I think is now used for a carpet manufactory), in which he was going to produce a number of engraved plates. I think I may say that that gentleman died of a broken heart, though I do not think, Sir, that the gentleman by your side [Mr. Pouncey] is likely to die of a broken heart. I know the case of another person who has since given it up—a Mr. Collin, who is now alive.

Mr. Pouncey.—Sir, in all the observations that have been made, not one single carbon print has been produced. Mr. Malone has very ingeniously led you round the different processes of engraving, but has not come to the point of carbon printing. Now we, as Englishmen, think that the proof of the pudding is in the eating; and I expected to have seen a lot of carbon proofs here this evening; and yet there is not one in addition to those I have brought. Then I ask, gentlemen, whether I am not entitled to ask the meeting to sanction the statement that the first carbon prints are produced by me, and that those produced by me to-night are equal to the silver impressions?

Mr. Vignoles.—Mr. Chairman, I rise to order. I think it is a standing rule in all societies that we are very glad to receive information, but it is one of the inflexible rules that we do not pronounce an opinion on other processes.

Mr. Pouncey was about to proceed, when

Mr. Bedford said—As this is an interesting discussion, and it is getting late, I propose that it be adjourned to another evening.

Mr. Thurston Thompson seconded the proposition, which was duly put and carried.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

An ordinary meeting of the above Society was held on Monday evening the 22nd ultimo, at the Golf Club-house, Blackheath, the President, J. Glaisher, Esq., F.R.S., in the chair.

After the usual business had been transacted, two new members were proposed, Stewart Knill and H. Williams, Esqrs.

A paper was read from Herr Pretsch, detailing the advantages of his "Photo-galvanographic process." The paper was accompanied by a series of plates illustrating each stage of the process, also by a number of impressions from various photo-galvanographic plates. Herr Pretsch also forwarded numerous copies of two stereographs—one from a plate, the other from stone—for distribution among the members of the Society.

It was resolved unanimously, "That the Secretary be requested to forward a letter to Herr Pretsch, conveying to him the thanks of the Society for his great kindness in forwarding his beautiful specimens, and assuring him of the great interest they had excited."

A short discussion on the paper ensued, in the course of which it was pointed out, that the least satisfactory part of the process was the second stage, consisting as it does of mere mechanical moulding in some plastic substance, and subject of course to all the defects of such a process.

Mr. Melhuish then exhibited a negative taken by one of Petzval's lenses with the full aperture (about 1·5 inch), and expressed his opinion that the lens thus used gave results at least as good as a single lens with a small stop, thus showing the advantage of the new lens.

Mr. Wood exhibited a series of very beautiful stereoscopic views in North Wales taken on dry plates, after which the meeting adjourned.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

MR. HARDWICH *on Gold Toning applied to Albuminized Paper.*

GENTLEMEN,—Although we have met together this evening for the purpose of discussing the merits of the new process for printing in carbon, yet I conceive that any remarks referring to improved modes of photographic printing in general will not be out of place, and especially as we may not all be prepared at the present time to speak from experience in the use of carbon. Improvements of every kind in photography will have our best wishes for their success, but it is prudent to leave the matter for a time in the hands of those who are giving their attention to it.

I am sorry to observe of late a disposition on the part of some to depreciate unduly our existing modes of printing, which, although not admitting of comparison with processes by printers'-ink as regards stability of picture, are yet very far from being in the hopeless state represented. It has been said that the labours of the Printing Committee, appointed by your Society, issued in nothing, and that they found all their pictures to fade. Now this is not the language of sober truth, and we can only regret that it should be used. I have in my hand cards on which the prints experimented on by the printing committee are mounted; and these cards show that although many pictures have not proved permanent, yet that others, printed in a different way, have stood severe tests.

In examining these cards, we may take, for instance, the proofs toned by sel d'or, contributed by Mr. Shadbolt; three months' suspension in air saturated with water has made no impression on them, and although they have been mounted more than two years since that time, they are still unaltered. Or again, let us examine the condition of certain prints sent to the committee by Mr. Waterhouse of Halifax. I have mounted one of them to show you that no perceptible difference can be made out between the two halves, although one has been subjected to the ordeal above mentioned.

It is with reference to Mr. Waterhouse's process that I wish to address you this evening; and since it appears likely to become very popular, it may not be without interest if I describe briefly how it originated. The prints were sent to the committee by Mr. Waterhouse with the following letter, as far as my memory serves me:—"I salt the paper with a chloride dissolved in a solution of caseine, and tone the image with chloride of gold. But inasmuch as Le Grey's process eats into the picture, I modify it by using an *alkaline* instead of an acid solution of gold. The alkali I employ is the potassæ subcarb., and I add more or less of it according to the tint desired."

Finding that this process was more manageable than Le Grey's, and produced very permanent pictures, I was induced, in an edition of the 'Manual of Photographic Chemistry,' which appeared about that time, to suggest a trial of it, having previously adjusted the proportions, and substituted carbonate of soda for carbonate of potash, as a salt more easily obtainable. In my own practice, however, I followed the sel d'or process, which gave me rather a better colour on plain paper simply salted.

Some time after this a personal friend of my own, whose name is very well known to this Society (I am sorry I have not his permission to mention it), informed me that he had carried out the process with albuminized paper, and found it more suitable for that purpose than the sel d'or. His plan was to warm the liquid, in order to make the gold go farther.

I did not, however, from some cause or other, obtain very certain results in the way he directed, and hence I was induced to try the effect of *a reducing agent*, with the hope of precipitating the gold more directly upon the image, and obviating the biting action of the chlorine upon the reduced silver. Honey was first selected; but finding that it reduced the gold of a blood-red tone, I changed it for citric acid, which, in a warm alkaline solution of the chloride, throws down an indigo-blue deposit of metallic gold. The citric acid I still retain without being able to say positively how it acts. I am told by others that it is merely a complication, and that they obtain equally good results without employing it. This may be the case, but each must speak according to his own experience, and we may be sure that any agent not really of service will ultimately be discarded from the formula.

As a member of the committee appointed by your Society, I offer this toning process as the best at present known for producing lasting colours on albuminized paper; and I must at the same time beg you to observe, that if the committee had not been formed, the importance of Mr. Waterhouse's modification might not so soon have been recognized. It is now, however, well known; and I doubt not that there are many present in this room who tone albuminized paper successfully in that way.

TONING BY ALKALINE CHLORIDE OF GOLD.

This mode of toning is adapted for any kind of sensitive paper; but its peculiar value is seen in the case of albuminized paper, which is sometimes difficult to colour by the sel d'or process, and, even in the ordinary fixing and toning bath of hyposulphite of soda and gold, does not reach an agreeable tone unless the bath be kept in a very active condition. Take of—

Solution of chloride of gold	1 fluid drm.
Sesquicarbonate of soda .	1 drm.
Citric acid	20 grs.
Water	12 fluid ozs.

The solution of chloride of gold contains 1 grain to each drachm, and is the same which the writer advises for the ordinary toning-bath and for the sel d'or process. The carbonate of soda is of the kind sold by druggists for making effervescing draughts; and the water is either distilled or pure rain-water free from lime salts, which, if present, would be precipitated white by the carbonate of soda. Pure citric acid, free from tartaric acid must be obtained.

It is not recommended to keep the solution ready mixed, since it gradually undergoes a change, becoming quite colourless, and toning more slowly. When frequently in use, however, it would be a simplification to substitute measure for weight, by making standard solutions of the carbonate of soda and of the citric acid; say 1 ounce of the former to 16 ounces of water, and, separately, 160 grains of the latter to a similar quantity, taking in each case two fluid ounces of the solution, and making up the bulk to 12 fluid ounces with distilled water. Solution of citric acid, however, when kept for a length of time, decomposes and becomes mouldy.

The writer prefers a strongly albuminized paper for this process, and especially one which prints rather red in the frame, since the gold will otherwise be liable to give too blue a colour. It is also important to use a full strength of sensitizing bath, so as to promote a rich and velvety appearance in the image: 60 grains to the ounce will do very well for a paper salted with a 10-grain salting solution.

The prints, after removal from the frame, may be kept for some hours, if desired, but not beyond that time advantageously. Begin by washing them in common water, allowing two or three changes until the fluid ceases to flow away in a milky state. Some use a final bath of salt and water to convert the last traces of nitrate into chloride; but the writer believes this to be unnecessary, since a trace of nitrate of silver in this process does not discolour the toning-bath as it does in the sel-d'or process, but simply forms insoluble carbonate of silver, which remains in the print until the fixing solution of hyposulphite is applied. Having prepared a stock of prints, leave them in the water until a convenient time for toning, which is done in the following way:—

Mix the ingredients of the formula, and when the effervescence has subsided, place a spirit-lamp beneath, and raise the temperature to about 120° Fahr., with constant stirring. It is not at all necessary to employ a thermometer, but simply to note when the steam begins to rise, and a bluish discoloration, due to commencing reduction, is seen. Now remove the lamp; or much of the gold will be reduced, changing the colour of the fluid to an inky black, after which it will be nearly useless. No filtering will be needed.

The above diagram shows the arrangement. An iron tripod-stand supporting a capsule, with a spirit-lamp, raised, if necessary, by wooden blocks, beneath. Any operative chemist would supply the articles for a few shillings; and they will be found useful not only for this purpose but also for many others, such as the preparation of the nitrate-of-iron developer for positives, heating solutions of gelatine, &c.

The warm liquid is poured out into a flat dish; and the prints are put into it, two or three at a time. A little discoloration of the toning solution may be disregarded, since it is caused by a quantity of gold quite microscopic, and will not injure the whites of the proof. Keep the pictures moving, and watch the changes in colour. The first two or three may perhaps be fully toned in about five minutes; but afterwards, as the liquid cools down, and the quantity of gold decreases, twenty minutes or longer may be allowed. The quality of the paper, however, will influence this point considerably, English papers strongly albuminized always requiring a longer action.

The time in the toning-bath must be regulated according to the colour desired. If the prints are removed as soon as the blue colour

of the gold is seen, they will usually change in the fixing-bath to a warm shade of brown; but when left for two or three minutes longer in the toning-bath the darker tint is permanent. Hold them against the light, and when they cease to appear red by transmission they are ready for fixing.

Over-printed proofs always yield the blackest colours, because they may be kept for a longer time in the gold without losing the half-tones: and, indeed, the state of the lighter shades of the proof is a good criterion of the time for removing it, since the chlorine previously combined with the gold has a bleaching action.

Do not attempt to get pure black and white tones on pictures printed from a feeble negative. Unless there be a perceptible amount of bronzing, the deep blacks cannot be obtained on albuminized paper.

Each grain of chloride of gold ought to tone six or seven prints of 5×4, and two or three of 10×12, which is rather more than the number yielded by the same quantity of gold in the sel-d'or process.

To fix the proofs.—After removal from the gold bath, wash back and front for an instant under a tap, and fix in the following bath:—

Hyposulphite of soda . . .	6 ounces.
Water	1 pint.
Carbonate of soda	½ ounce.

The object of the carbonate of soda is to prevent the fixing solution from gradually acquiring sulphur-toning properties to an injurious extent. The bath may be kept for many weeks, and gives a slightly improved colour when it has been much used. Add fresh crystals of hyposulphite occasionally. The time of immersion is from 10 to 15 minutes, but the proper guide is the appearance of the finished prints after washing: if imperfectly fixed, they will show mealy spots in the substance of the paper when held against the light.

Wash in the usual way; but if the water contains lime salts in considerable quantity, change it quickly at first, lest a white deposit should be produced by the carbonate of soda remaining in the paper. *N.B.*—These pictures will stand hot water; but it is not required so far as removing the size is concerned, since this is effected by the alkaline liquids used in toning and fixing.

Failures.—No fear need be entertained of the whites turning yellow; they ought, on the contrary, to be unusually pure and good. *Blisters*, appearing in the washing, have been spoken of, but the writer has found that they mostly disappear on drying. Possibly they may be due to acidity in the size of the paper, liberating carbonic acid from the carbonate of soda, and thus inflating the albumen. Their non-occurrence when an acid solution of chloride of gold is employed in toning, in place of an alkaline solution, favours this idea*.

PHOTOGRAPHIC CHEMISTRY.

Photometallographs.

[From a paper read before the Edinburgh Botanical Society, March 1857.]

PLAN of photometallographs, given as better than that of Mr. Talbot then published, and which appears to me to be in some respects preferable even to his new one:—

1. Coat your plate of zinc, iron, steel, copper, or other metal, with the sensitive mixture of bichromate, chromic acid, uranic, or other salt, along with gelatine, gum, metagelatine, or allied substance.

2. Dry the plate gradually, or by the aid of heat.

3. Print in pressure-frame metallically.

4. Connect the plate, by means of a screw clamp, or other arrangement, with a plate—say the same size—of silver, platinum, platinized silver, or other less oxidable metal, and coat the *back* of the first plate with varnish.

5. Plunge the two baths into a weak solution of sulphuric, muriatic, nitric, or other acid, or other etching fluid, watching carefully the process of etching, and putting into a weaker or stronger etching-bath if required.

6. Wash off the remaining gelatine mixture.

N. B.—Instead of coupling the plates in the manner now described, we may connect the plate (first varnished on the back) with the wire of *one* (the oxidizing) pole of a galvanic battery or cell, and a plate of silver, copper, or other less oxidable metal, with the wire of the *other* pole, and plunge the two plates, opposite each other, into the etching-bath,—the strength of action being regulated either by the strength of the battery (which may have its metallic elements raised or depressed in their cell or trough), or by the strength of the etching-bath. If the plates are connected as first described, it is of course by the latter that we regulate it.

The galvanic action or connection which I have introduced, prevents that liberation of hydrogen or other gas-bubbles from the metal

* The beautiful picture which Mr. Hardwich produced (20×17) is left at the room for the inspection of Members, together with other specimens produced by the same mode of manipulation.—ED.

to be etched, which would interfere materially with the regularity and uniformity of the etching, and which would be apt to injure the coating of gelatine, &c., or other coating of the plate. It will be seen at once that the gas is on this plan now evolved on the *less* oxidable metal, *instead of on the plate* being etched.

As the plan of applying resin-powder *above* the gelatine or other coating before etching would not be likely to answer, we may perhaps apply it below, or *far rather* follow out a plan or plans suggested to me by the shade of fine gauze, mentioned by Mr. Talbot as adopted by him in one of his old processes. I would recommend a set of fine *crossed* or uncrossed lines or dots, photographically or otherwise produced (we may get very fine lines or dots by photography, on a *smaller scale*, from those accurately *drawn* on a *much larger* scale,—they may be either on a separate glass or on the print itself), *from* which we are printing on the metal, or a little charcoal-powder, lycopodium, or other fine powder may be sprinkled on the back or front of the print, or on a separate glass (to be placed above it). (The same set of lines, if on a *separate* glass, may answer for printing from any number of different prints.)

This same mode of procuring grain will answer equally well for photolithography, or for photoxylographic blocks — gelatine and perchromate, &c. C. I. Burnett.

APPARATUS.

Description of a New Pistol Camera.

To the Editor of the Photographic Journal.

Vanburgh House, Blackheath,
November 24, 1858.

Sir, — In forwarding the accompanying drawing of my newly-invented pistol camera with which I photographed the small concave glasses I had the honour of submitting to your inspection last Friday evening, permit me to state briefly the causes which led to the construction of this little instrument. Last July a letter appeared in the Photographic Journal, by Mr. Sutton, on the Plano-convex Lens, in which occurs the following passage:—

"It has frequently occurred to me that negatives might be taken on spherical glass plates like watch-glasses, and copied, not by superposition, but in a copying camera. The curvature of the negative would be greatly in favour of this mode of copying, and if negatives were taken on watch-glasses or spherical surfaces, portrait lenses of large apertures might be used for instantaneous pictures out of doors, which would then be sharp to the edge.

"*At present photographers are terribly hampered by being compelled to work upon a flat surface.*"

Now, Mr. Editor, I see no reason why a photographer should be compelled to work upon a flat surface if a curved one promises superior results. It is not yet three years since I took my first lesson in photography, with the view of getting the sun to assist me in enamel painting, which that luminary did as soon as I had mastered manipulating on the necessary convex surface of an enamelled plate, and the concave interior of a glass lunette. The difficulty of photographing on both these curves was fairly overcome before Mr. Sutton's letter awoke me to the advantage which might be derived by catching the pure curved image transmitted by a perfect lens in a sensitized bowl made to fit. Thereupon I placed myself in correspondence with some of the most eminent opticians of the day, canvassing their opinions on the matter, and soliciting assistance in the construction of a lens expressly adapted to give pictures on concave glasses of a given curve. All agree not only on the practicability of constructing such a lens, but that such lens would give not only a sharper picture on a curve, but that such picture would be photographed in less time than any picture of equal dimensions could be on a flat surface by the quickest portrait combination known.

These opinions are supported by actual experiment.

The specimens I submitted to you on the 1-inch watch-glasses were produced by a common Codington lens $\frac{3}{4}$ths of an inch in diameter, stopped down in the centre to $\frac{1}{8}$ths of an inch. Now, if with such a simple, and by no means carefully ground, lens, "The Donkey and Boy," which you observed was not inferior in sharpness of definition to the productions of many portrait combinations, and "The Greenhouse," which, I suspect, no portrait combination in existence could have produced anything equal to it with the like shortness of exposure in the month of November, what may not be expected from this small instrument when science has supplied it with the most suitable objective? The most eminent opticians and constructors of photographic lenses confess that, in order to realize a large picture on a flat surface, a considerable sharpness of definition has to be sacrificed before the primitive pure curve can be whipped into a straight line. And as this is the case more or less with all portrait or landscape combinations hitherto constructed, not even excepting "the last of

the Petzvals," it is not surprising that so many attempts to reproduce photographs much larger than the original should so frequently have proved failures. If Mr. Birtch, as stated in the 44th page of the Photographic News, has succeeded in photographing the parasite of the parasite of a bee by magnifying it 1000 diameters,—that is to say, 1,000,000 times in surface,—why may not a photograph taken by an *unfracting*, that is, a perfect lens, on a coinciding curve 1 inch in diameter, be magnified, when required, to a like extent? But

Skaife's Patent Pistol Camera.

[Drawn the size of the original.]

Fig. 1.

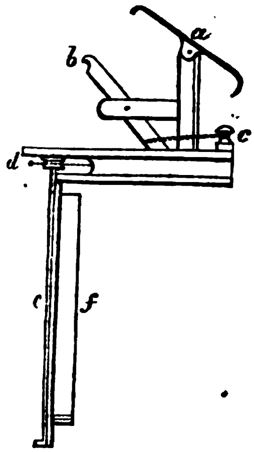


Fig. 2.

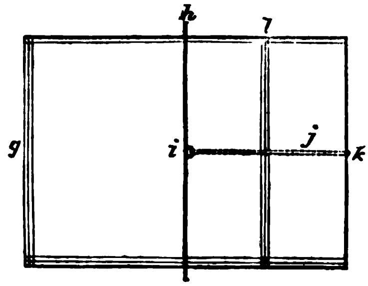


Fig. 3.

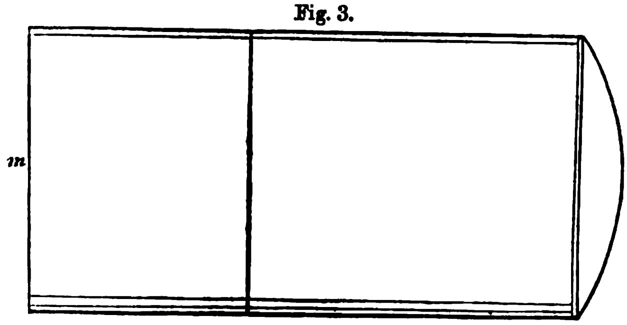
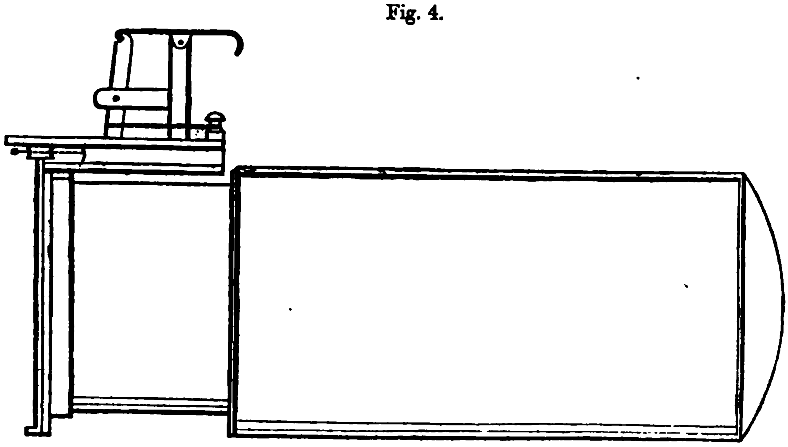


Fig. 4.



admitting that a concave photograph will only admit of being magnified ten diameters, this would be no trifling recommendation to the curved process, which admits of the whole apparatus, including camera, box of a dozen glasses, and all necessary chemicals for sensitising, developing, and fixing, being stowed away ready for instant use in an overcoat pocket.

But this is not all, for while the pistol camera can photograph in small any object of still life within the range of larger cameras, it can realize pictures of objects in motion, not only more rapidly than can any other camera,

but can secure pictures under circumstances and in positions in which no other camera can be manipulated,—not only *à la* pistol, but whilst concealed within the unsuspected photographer's sleeve,

THOS. SKAIFE.

EXPLANATION OF THE DRAWING.

Fig. 4 is an outline of the pistol camera, equal in size to the original, constructed to photograph concave glasses 1 inch in diameter or under. It is composed of three parts, viz.:—

Fig. 1, formed of brass and steel, contains a pair of patent shutters with opening trigger. Fig. 2, the barrel, virtually the camera, contains the lens. Fig. 3, the handle.

When in use, Figs. 1 & 2 are screwed together at *f*, *g*, and Fig. 3 (the handle) is slid on to the barrel at *k*, until the open and hollow part of the handle, *m*, is stopped by the shoulder on the barrel at *h*. *i* is a hook to which is attached an elastic band *j*, which serves to keep the concave glass in its place when focused by the screw-adjustment *l*. *a* is a brass detent which holds the steel trigger *b*, when distending the india-rubber spring hooked over the nob *c*. Light is admitted to the sensitized "*concave*" by pressing upon the curved end of the detent with the finger or thumb, allowing thereby the lower end of the steel trigger or lever (impelled by the india-rubber spring) to strike a piece of brass to which a couple of silk threads are attached in connexion with the shutters' axes *d*, in such way that the trigger can only reach home by giving the required opening to the shutters *e*.

Unscrewing the pillar which supports the trigger a quarter of a revolution, leaves the piece of brass free to be manipulated by a finger when a very rapid exposure is not required.

MISCELLANEOUS.

On the Perspective of Photography.

[Concluded from p. 84.]

A $\frac{1}{4}$-plate lens, if really good, and a sliding camera 4 inches square, will take negatives large enough to be seen by good eyes, and will print from them to any reasonable size afterwards by the following very simple arrangement. In most houses there is some room where an opening exists in the roof through which the sky can be seen, or where such an opening can be easily and cheaply made.

There is usually a skylight in a garret, or a hole for shooting coals into a cellar, or at all events there must be a short chimney-flue available somewhere. Through a hole in the top of a room introduce the lens of the camera, leaving the camera itself to rest on the edges of the hole, taking care that the edges are *level*. Place the negative which is to be copied in the dark slide where it was taken, and having shut out all other light, allow the light of the sky to shine through the negative, and the lens on a table placed below it and carefully levelled. Sunlight must be avoided, unless reflected in the proper direction by a mirror or prism, or dispersed with ground glass.

The image of the negative can be focused on a sheet of white paper laid on the table, and the size of the positive will vary with the distance from plate to plate. The chemical operations can be carried on inside a real "camera obscura," and the glass plates or prepared paper may be taken direct from the baths and laid on the table beneath the lens. If all is *level*, then the surfaces are parallel to each other, and all is as correctly placed for working as if the apparatus had cost a hundred pounds instead of a few shillings.

I sent to the Exhibition some positive transparencies printed by this process on wet collodion, in a garden room which was altered to suit my purpose at a cost of fifteen shillings; my apparatus itself cost seven pounds, and need not have been so expensive. It is the apparatus described by me in the Liverpool Journal, in a paper of which I send a copy, and constructed for me by Mr. Ross last August, expressly for printing on wet collodion.

The process by which these pictures were produced is the usual wet collodion process, the same by which the negatives were taken, with this modification:—the plates when taken from the bath were slightly washed by pouring a little distilled water over the collodion, and the developing solution was poured on before the plate was laid on the table under the lens. The progress of the printing, which lasted about forty seconds, was watched by yellow light from a window covered with calico, and when the print appeared to be dark enough, it was washed, fixed, and dried as usual. The colour of these specimens is remarkable. This arrangement appears to be worth attention.

In the first place, it has been shown that the pictures are more correct representations of the objects than pictures of the same size taken with large lenses at small distances. It is evident that the picture taken at 20 yards is in better drawing than that taken at 10, and that both are superior in that respect to the distorted picture taken at a distance of about 6 feet with the same lens.

In the second place, a quarter-plate lens and a small camera, costing little and easily carried, will produce negatives which the same apparatus will print by the same process to any reasonable size. A negative 2 inches square will produce a diminished positive invisible to the naked eye, or one 2 feet square by varying its distance from the lens.

The cumbrous and costly apparatus of large cameras can be dispensed with. The glass

plates used in printing may be of any size or shape, or sensitive paper may be used if preferred.

The time of exposure for positives is not a matter of uncertainty, for the printing may be watched. The intensity of parts of the proof can be varied by shading off the light while the operation proceeds.

The negatives can be effectually preserved by covering them with a glass cemented with Canada balsam, and boxes for their preservation are not required; crystal varnish is unnecessary. Collodion positives may be used as transparencies, or backed with white when they appear as drawings, or backed in oils when they resemble oil pictures; or they may be removed from the glass to paper, and kept in books, as ordinary photographs are, by using a gutta-percha solution. In short, photographic drawing can be improved, while the art is made cheaper and simpler.

If better and more correct apparatus were used, better results could be produced; but in the mean time, I trust that the pictures which I sent will prove that the faulty perspective of photography can be easily improved, even with lenses such as I possess. J. F. CAMPBELL.

Postscript, Oct. 28th, 1856.—I hope to send to the Christmas Exhibition a few prints illustrative of this paper. I sent several with the manuscript to the late editor last time. The paper did not appear in the Journal; the prints were exhibited, but were not named in the catalogue. A better workman could easily produce better work than I can. A professional artist might afford to work on a larger scale; but, by exhibiting my imperfect work, I hope to induce more skilful operators to try the plan which I have adopted and described. The main obstacle to the production of full-length life-size portraits, *in good drawing,* appears to be the expense of the materials.—J. F. C.

Combined Levelling and Developing Dish.

To the Editor of the Photographic Journal.

Stockwell.

SIR,—Having found the following form of developing and levelling dish, designed by myself, exceedingly cleanly and convenient, I am induced to introduce it to the notice of my brother photographers, through the medium of our Journal. It is particularly adapted for use in developing pictures, either within a dark box or away from head-quarters. Have a tin or water-tight box made, about half an inch longer and broader than the glass plate to be operated upon, and about 4 inches in depth. Let two cross wires be soldered to the sides of the box, at a distance of half an inch from its upper edges, and equidistant from each other and the extremities of the dish. Upon the centre of one wire, and at a short distance from either end of the other, attach three quarter-inch pieces of wire so as to support the plates at three points only. To two corners of the bottom of the box, and at the centre of the opposite side, fasten three pieces of brass, tap and fit with thumb-screws: let these thumb-screws be of sufficient length to keep the whole at the height of an inch from the table. These screws will enable the plates to be exactly adjusted to a horizontal position during development, and from their situation will be kept free from the developing fluid. The above arrangement will enable the operator, by holding the dish, to give any required motion and inclination to the plate during the period of development without handling the glass itself, and to restore it instantly to the horizontal position. The superfluous fluid will be received by the lower part of the dish, thereby ensuring hotel sitting-room furniture, interior of dark box, &c., from contamination, and furthermore will be found less cumbersome than any other form of levelling stand and developing tray at present in use.

THOS. SEBASTIAN DAVIS.

BOOKS RECEIVED.

'The Ambrotype Manual,' selected from the works of Charles A. Seeley, A.M. Liverpool, 1859.

'Répertoire de Chimie pure et appliquée.' Paris, October, 1858.

The notice of the excellent and interesting work on Madagascar, by the Rev. Mr. Ellis, must stand over until the 21st.

Communications from several correspondents, including Mr. Neville and Mr. Pretsch, are in type, and are delayed from the length of the report of our proceedings at the monthly meeting.

ANSWERS TO CORRESPONDENTS.

GENTLEMEN desirous of admission into the Photographic Society, are requested to communicate with the Secretary, 1 New Coventry Street, Piccadilly, W.

Mr. M'Craw (Edinburgh).—The substance of your communication shall appear in our Number of the 21st inst.

J. Johnson.—We are of the same opinion respecting the use of gutta-percha baths; some are very good, and others much the contrary. Porcelain baths are certainly to be preferred.

Perseverance.—An extending rigid camera is the only one applicable to your purpose. In copying a print, if you desire to produce it of the same size as the original, it must have the same extent from the posterior part of the lens, as the picture is placed in front of it. The two distances must, in fact, coincide. If your camera does not admit of sufficient extension, it may be temporarily accomplished by means of a prolongation of it with a board placed at the top and bottom of the camera, and the whole enveloped with some fabric impervious to light.

J. R. H.—Fix your pictures as soon after printing as possible. See the report of our Meeting of the 7th inst.

Tyro.—Use the formula *last* given, for it is more economical than the former; success will attend either.

Enquirer.—The address of Mr. Eliot is 4, Elm Grove, Peckham. The alcoholic collodion which he has proposed, we believe at present, can be obtained of him.

H. B.—1. It is our intention to return to the photography at the Crystal Palace in a future Number. The directors advertised to receive tenders for renting the photographic department for one year from the 1st of January next. 2. Apply to Mr. Grove at the Crystal Palace, or to Professor De la Motte, King's College.

A. Z.—1. The ivory must be prepared with as smooth a surface as possible; even more so than for miniatures would be desirable. 2. Your question is not clear; but *all* ivory pictures should be more printed than if on paper. 3. Treat your ivory exactly as you would paper, and after using the toning-bath, use the hypo. 4. If your proof is unsuccessful, soak it well in water, until there is no chance of any chemical remaining; remove the faulty picture, and restore the surface to its former fineness, when it may again be used as well as new ivory.

Alfred S. Fisk.—As a general rule we believe there is nothing in the practice of photography in the least injurious to health; but there are idiosyncrasies of constitutions, and it is probable that a sore throat may be produced in the way you describe. We have known several persons much affected with the smell of the ether in the collodion, and some rendered ill from the mere odour of cyanide of potassium.

Querist.—1. See Mr. Hardwich's communication in this day's Journal. 2. Both wax-paper negatives and calotype ones are liable to be damaged by minute particles of nitrate of silver being disengaged from the prepared positive paper and adhering to the negative; occasionally this occurs from paper perfectly dry, and the negative does not show the damage it has received until an after-exposure to damp. If nitrate of silver is adulterated it deliquesces, and thus may produce the result. We have found that no application of cyanide can be applied without damage to the negative; the only means we have adopted has been to carefully scrape away with a fine penknife any opake spot, but of course this is tedious, and not always practicable.

Hubola.—1. Read Mr. Hardwich's communication. 2. In making a copy of any production, a landscape lens is the proper one to use, unless the object be small and the surface flat, in which case a portrait-combination may be used advantageously.

Samuel Fry.—Stereoscopic pictures will be admitted at the approaching Exhibition; but if you wish to exhibit transparent ones, you had better supply your own apparatus, which will have a permanent locality assigned to it.

Old Subscriber (*Newport*).—We can give you no information on the "Alabastrine Process." It is probably a solution of the bichloride of mercury which is used. We had in our possession a picture done by the late Mr. Archer, in which the bichloride of mercury was employed, and which lasted unchanged for some 5 or 6 years, but from having altered its locality, it has in about 3 months become almost obliterated.

L. L. D.—We have not such a lens as you describe, and the knowledge desired seems only to be acquired by actual experiment. If you apply the lens to your window, and make your room your camera, you may, with a large sheet of paper, arrive at the extent of field the lens will cover.

J. B. Best, Nemo, A. B., Photo, Perseverance, R., J. F. S. (*Southampton*).—You will find your queries fully answered by perusal of Mr. Hardwich's communication in the present Number, but shall be happy to reply to any specific question required.

John Thomas.—The bath will answer equally well for albuminized or plain paper, but plain paper will give you the darkest tones. Ivory-like positive pictures are produced by using the protonitrate of iron as a developer with about 2 drams of Beaufoy's acetic acid to each ounce of the solution. The perfectly white appearance is given by a solution of the bichloride of mercury *after* the picture is finished. Thanks for your suggestion.

J. F. (*Usk*).—Many thanks for your information, which has been forwarded to our friend.

S. Scrivener (*Bury St. Edmunds*).—It would be impossible to advise you without seeing the pictures. Three members of the Council of the Society constitute the Exhibition Committee, and they will select, to the best of their ability, such productions as seem most worthy of exhibition.

"*A Prejudiced East Anglian.*"—Write direct to Mr. Pouncey, Dorchester, who will afford you the information, and, we believe, supply you with the means of working the process.

T. Barrett (*Reigate*).—1. Same reply as to 'Enquirer.' A series of pictures were exhibited by Mr. Eliot at our last meeting, executed with the collodion, which he advocates. 2. We have never used it ourselves, and therefore cannot reply.

J. H. J. (*Tilshead*).—Your pictures are very satisfactory: the light appearance of the red-tiled roof is probably from its being wet, and reflecting the light. Bromides readily dissolve in a very small portion of water. If you first add a few drops of water, the alcohol will afterwards suspend it.

J. H. E. Tucker.—1. When a picture has been sufficiently immersed in a hypo-bath, it is perfectly transparent when held up to light, and has not the granulated opake spots in it which exist when first immersed. 2. There is no varnish equal to amber varnish when properly prepared, but it is exceedingly difficult to obtain genuine. If it is pure, when dry it becomes so hard that no ordinary roughness will injure it, and never cracks. In the absence of amber varnish, use the French varnish, made by Soehnée, Paris, and sold by most vendors.

Joseph Wellings.—If you will give us authority to propose you as a member of the Society, it shall be done.

Communications received from — The Rev. C. P. Cleaver; T. Easter; H. P. Robinson; Mr. Rolfe; Charles J. Burnett; H. Jacobi, of Barmen; Baynham Jones; Robert Cade, Ipswich; T. Reeves, Plymouth; Mr. Henry Dix Hutton.

Errata.—Page 77, column 2, line 11 from bottom, *for* 'even,' *read* 'new.'

R.—See answers to correspondents above. Undoubtedly to use new hyposulphite is the best.

All Communications for the Journal should be addressed to the Editor, at the Publishers, Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street, E.C.

THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 75. DECEMBER 21, 1858.

The Council having weighed considerations, from all quarters, on the proposed rule of excluding from their January Exhibition photographic pictures previously exposed to the public eye, they find that differences of opinion exist among practical artists as to the scope and operation of the proposed rule. Some of their best friends—some even of those who most strongly advocate such a rule in the abstract—fear that, coming suddenly on photographers who have neither prepared for nor foreseen it, this regulation may prevent pictures being sent in which would assuredly be hung on the walls if received. They have therefore, to prevent possibility of mistake on the part of their fellow-labourers in all places, resolved to rescind the rule so far as concerns the approaching Exhibition.

"The Council of the Photographic Society, in accordance with the wishes of a large number of photographers, have determined to alter the rule they had made with regard to the admission of pictures into their forthcoming Exhibition which have already been before the public. All pictures will now be admitted, subject to the usual sanction of the managing committee of the Exhibition. The time for the reception of photographs will, in consequence, be extended to the 27th instant."

In consequence of some unfounded misrepresentations which have been made, several letters have been addressed to us, all of them lamenting that Dr. Percy had ceased to aid the members of the Council with his able advice, from a disapproval of their policy in the conducting of the affairs of the Society. To refute so impudent a report, Dr. Percy has sanctioned that his letter to the Council may be circulated amongst the members of the Society at large, and also authorizes us to state explicitly that his attachment to the Society is unabated, and that there is not the slightest foundation for the assertions alluded to.

Museum, Dec. 2, 1858.

My dear Dr. Diamond,—

In a very short time my connexion with the Council of the Photographic Society will necessarily cease; and wisely so, an infusion of fresh blood being from time to time essential to the vigorous existence of that presiding and executive body. This night we commence a fresh season, and, I trust, with the renewed assurance of success. It will, I think, be well at once to appoint a successor to myself, that he may begin his career with the beginning of the season. Moreover, I am anxious that the Council should release me from the duties of the V. P., as I feel that I cannot well devote the time necessary to the proper discharge of those duties. May I request you, then, to lay my resignation before the Council this evening, and at the same time to express, on my behalf, the pleasure I have ever derived from the society of my colleagues. Through my connexion with the Council from its commencement to the present time, I have contracted friendships which I hope and believe will long survive. I shall always rejoice in the prosperity of the Institution, which, I am sure, has already been productive of much good to photography. My impression is, that marvellous advances will yet be made in the art, and especially in the science of that art,—a science which, although it depends on *light*, may yet be said to be very much in the *dark*.

I remain,

Very faithfully yours,

John Percy.

Dr. Diamond,

Secretary of Photographic Society.

With regard to the *retirement* of Sir George Clerk it is only needful to say that his other important duties prevented the Council having the pleasure of his presence so often as they could have wished, and that Sir George Clerk thus retires in accordance with the rules of the Society, from having attended a fewer number of times

than those other members whose names are retained on the list for the forthcoming election.

In addition to the list already published, we have the pleasure to add the name of Mr. Gutch of Clifton, as being willing to assist the Council in their wish to distribute during the year a photographic specimen of our art to each of its members.

Messrs. Murray and Heath have kindly forwarded to us a most interesting specimen illustrating the pleasing and useful powers of our art in recording events. It is a well-executed photograph by Robert Morrison, Esq., attaché to H.B.M. mission in China, and represents the imperial commissioners Keveiliang and Hevashana dressed in their mandarins' costume, and sitting at a table, evidently not unmindful that their representation was about to be perpetrated. The picture was taken July 1st, in the present year. A visit to Messrs. Murray and Heath would be well repaid by an inspection of this picture by any of our members who have an opportunity of so doing.

As the good Homer sometimes nods, and the bow of Apollo is sometimes unstrung, we may venture to claim, as a slip of the pen, a definition of photography that recently appeared in one of the leading articles of our great literary Jupiter Tonans, "The Times." At the late examination at Addiscombe, some very creditable photographs were exhibited, produced by the cadets, to whom the art is now systematically taught. In mentioning the skill with which the youths acquitted themselves in erecting model forts of sand, and in other elegant exercises of budding warriors, the writer observes, with a sort of gentle surprise, that "even the humble but useful craft of the photographer has been exercised to good purpose." This is our little grievance,—made the more galling as we may not find fault with the individual terms employed: for all true knowledge or wisdom is humble; photography is undeniably useful; and "craft" is a good Saxon word, that has been held to mean an art or science by learned etymologists. Still we stand on our dignity, and protest against the whole definition as unjustly representing our gentle art, just as the mention of "The Times" as an uncommonly big sheet of printed paper would fail to convey a satisfactory idea of that wonderful epitome of the world's daily work with the meanings thereof.

We believe that when some of those young hearts, that beat high with delight at the printed mention of their names, shall be at rest for ever within the shadows of the grim realities now so deftly mimicked in sand—

> For things like that, you know, must be
> At every famous victory—

there will be those at home to whom the work of the photographer will prove more precious, and his "humble but useful craft" afford more consolation, than the design of a fortification that Vauban might have envied.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

ORDINARY MEETING.

December 14th, 1858.

HORATIO ROSS, Esq., in the Chair.

The minutes of the preceding Meeting were read and approved.

Mr. J. T. TAYLOR was elected an Ordinary Member.

The Chairman congratulated the meeting on the great excellence of the Society's third Annual Exhibition, which is to be opened on Saturday next. It presents, he said, a finer collection of photographs than, he believed, had ever before been exhibited, and was a very great improvement on their Exhibition of last year.

The Rev. T. M. Raven then read a paper on "Pau and the Pyrenees, with a slight Sketch of a Photographic Tour made to them through the west of France." (See below.) The paper was illustrated by upwards of sixty views taken by the waxed-paper process.

On the motion of Mr. Johnston, seconded by Mr. M'Callum, a vote of thanks was awarded to Mr. Raven for his interesting communication.

Mr. Burnett made some remarks on Uranium, which are now in the writer's hands for revision previous to insertion in our next Number.

Pau and the Pyrenees, with a slight Sketch of a Photographic Tour made to them through the west of France. By the Rev. T. M. RAVEN.

I SHALL not trouble you with many remarks this evening on the "Waxed-Paper Process," which was the one I employed during my recent continental tour. We have so lately had two papers read on this process before this Society (one by Dr. Thomas Keith, and the other more recently by Mr. Kinnear), that there is little or nothing for me to say on this part of the subject. It was after reading Dr. Keith's admirable paper on the waxed-paper process that I determined to adopt it. I was at that time living in a country parish in Yorkshire, and had to fight my way through photographic

difficulties and troubles unaided and unadvised by any one. I had been working some little time with various processes before I came to Edinburgh, when I became a member of this Society, where I at once met with kind advice and assistance, by means of which my difficulties soon gave way. This Society is to me, therefore, a kind of Alma Mater; and if any one thing more than another has urged me to overcome difficulties and annoyances in travelling with a camera on the Continent, and taking pictures where heaven and earth seemed to conspire together to prevent my doing so, it was this—that I trusted some day to find myself once more in this room, among old friends, with a presentable set of photographs to show them.

I wish only to make one or two remarks on the waxed-paper process. No one can work long at any process, I think, without striking out a line for himself, and improving, as he may think, on the formulæ of others. I find the use of complicated iodizing solutions are not only unnecessary, but that the results are not so good as when the formula is more simple. I certainly prefer whey to water for the iodizing solutions, and am inclined to think that the less bromide of potassium that is used the better. My formula is—

Whey	36 ozs.
Iodide of Potassium..	500 grs.
Bromide	90 grs.

with a few drops of tincture of iodine.

The French papers have much more affinity for the colouring matter imparted to them by the tincture of iodine than the English. It is necessary to replenish the iodizing bath with a small quantity of iodine when the papers show that it is nearly exhausted. The best papers for the waxed-paper process are Cansons and Papier Rive.

I have iodized a good deal of paper with much less bromide than 90 grs. to the 36 ozs. of whey, and think that paper simply steeped in a solution of whey and iodide of potassium, will give results as fine as can be desired.

I have given up all attempts to make such an iodized paper as requires a short exposure. I never expose under 12 or 14 minutes in a good light; and for dark subjects I expose 20 or even 25 minutes. I use a Ross's lens, which, by-the-by, I think works slower than others I have occasionally used. This exposure may be considered as unnecessarily long. I can only say, that I have lately given half an hour's exposure with one of Dr. Hill Norris's dry collodion plates, and found, on developing the picture, that it was under-exposed. The subject was certainly unfavourable to any photographic process, but I could have got as good a picture, or better, with less exposure with waxed paper. Some positives, that I will presently hand round will show you, I think, that the waxed-paper process can give distance and aerial tones with a greater degree of softness and delicacy than can be obtained by any other process. The pictures may not be so sharp or clear as those obtained from collodion negatives, but whether such effects are true to nature and to be desired, I very much question. I always sensitize my paper as well as develope it in a glass dish, or in a gutta-percha one lined with glass. It is quite necessary, in travelling on the Continent, to take with you an ample stock of chemicals, also an extra piece of ground glass for the focusing frame, and one or two pieces of glass for the dark slides.

Let me also recommend no one to go without a syphon. I found one I took with me invaluable. In many places the houses abroad are so well supplied with water that no one thinks of saving the rain-water. I have only to fasten my syphon into the pipe of the roof of a house during a shower (which in France is an easy matter to do, as most houses have their balconies which run immediately under the roof) to catch all the water I require.

Distilled water is an expensive luxury abroad, and is difficult to get good. In preparing developing and washing papers in a sitting-room the syphon is invaluable, as dishes can be emptied by means of it without the slightest fear of spoiling tables, floors, or carpets, where you have them.

We left Jersey for St. Malo on the 29th of October last year, and sailed up the river Rance to Dinan.

In passing from the steamboat into the town I saw so many subjects for the camera that I determined to stay there a few days, and fixed on the Hôtel de Bretagne as the proper resting-place for a photographer, in consequence of its having an imposing-looking pump before the door, at which I worked pretty well before we left the place. The hotel is comfortable for one in Brittany; but like them all has got a host or hostess who would skin you if they could realize anything by the operation. The *salle-à-manger* was ornamented with a framed print of an hotel in the neighbourhood, under which was printed in French, German, and English, its chief recommendations. The English translation stated that there were pleasant "graves" in the grounds for visitors.

The weather was wretched, with the exception of a few hours, during the week we spent in this place, of which, however, I made the most. The cathedral is an interesting specimen of the Romanesque style. Close to it are some exceedingly picturesque old houses. Lehon, a

small village a mile from Dinan, is well worth visiting for its old abbey and pretty situation. Having explored this neighbourhood we went on to Nantes, passing through Rennes. In the latter place I saw nothing to make me regret that we were so soon going to leave it. To the former place the ladies of my party took such an aversion, in consequence of a very dirty hotel at which we stayed to breakfast, that we determined to go on that very evening to Angers. The west door of the cathedral of Nantes is magnificent; and I greatly regret that I had no sensitive paper with me. There is little else, however, in the town to see.

In few continental towns will the photographic artist find a greater number of subjects for his camera than in the fine old city of Angers. The cathedral has that drawback to its beauty which it holds in common with almost every fine old church, that of being closely hemmed in with houses. The west door is fine; and the small square before it will permit of its being taken in the camera. Its fine and beautiful spires are a pretty object from almost every part of the town. The tower of St. Aubin, the only remains of a desecrated church, is a venerable and imposing-looking building, now used as a military storehouse. Between it and the cathedral are some exceedingly picturesque specimens of ancient domestic architecture. I only found my way to the ruined church of Toussaints a few minutes before our train started for Saumur, so famous for its druidical remains.

Not far from the main road stand these *Pierres couvertes* as they are called, in all their mysterious concealment, puzzling the mind and exciting the imagination with their rude forms and simple contrivances. The temple of Saumur is not a quarter the height of Stonehenge, but is entirely covered in, and apparently of ruder construction, there being no art whatever used to keep the stones together, except that of placing them one over the other: the height is not more than 3 yards from the ground; but it has evidently sunk in the earth, and that considerably. Its length is about 18 yards from the entrance to the back, which is closed in by a broad flat stone 5½ yards in length. The sides incline inwards, leaving the covering stones projecting like a cottage roof. At the top of a neighbouring hill, which commands an extensive view of the charming Loire, with the old castle and pretty town, is a similar temple, though of smaller size. These interesting remains are not suited to photography; so we determined to take the next train to Tours, where we stayed two or three days, while I took a few negatives of the west front of its gloriously-beautiful cathedral, as also two views of the towers of Charlemagne and St. Martin, which are the only remains of a large church of great magnitude and importance.

Our next point was Poitiers. The churches in this place were all under repair with the exception of that of Notre Dame. It was impossible, therefore, to attempt to take many pictures in Poitiers, which is one of the dirtiest of dirty places. It is at the same time one of the most interesting towns on the continent. The churches are extremely curious, although in general so battered and worn as to present the aspect of a heap of ruins at first sight. This is particularly the case with Notre Dame. I never saw a church the appearance of which was so striking, not from its beauty or grace, but from the singularly devastated, ruined state in which it towers above the buildings around, as if it belonged to another world. Nothing about it has the least resemblance to anything else; its heaps of incrusted figures, arches within arches, niches, turrets covered with rugged scales, round towers with countless pillars, ornaments, saints' canopies and medallions, confuse the mind and the eye. All polish is worn from the surface; and so crumbling does it look that it would seem impossible that the rough and disjointed masses of stones could keep together; yet when you examine it closely, you find that all is solid and firm, and that it would require the joint efforts of time and violence to throw it down even now.

St. Hilary, St. Martin, and all the saints in the calendar still fill their niches, more or less defaced,—row after row, sitting and standing, decorate the whole surface; in compartments, choirs of angels, and troops of cherubim surround sacred figures of larger size; and when it is recollected that all this was once covered with gilding and colours, it is difficult to imagine anything more splendid and imposing than it must have been. The curious old church of St. Porchaire is worthy of note for its fine Roman tower, and a portal of great singularity. The latter is ornamented with medallions of the rudest workmanship: one capital represents Daniel and the Prophet Habakkuk, with lions of a strange shape; but in order that no mistake may arise as to their identity, besides the inscription which surrounds the medallion—"Hic Daniel Domino vincit cœtum leonum"—the artist has engraved in conspicuous letters between the animals the word "*Leones*."

In the afternoon of this day we went to Angoulême, where there is nothing much to see. I had just time the following morning to expose one piece of paper in my camera before we started for Bordeaux, which is a

magnificent city, and full of fine subjects for photography. The weather, however, was so dark during the time we stayed in this place, that I did not even unpack my camera. The antique buildings of Bordeaux, so curious for their history, have, in spite of repeated wars and the effects of time, preserved a great deal of their original appearance; and some of them are as fine as any to be found in France. Amongst these the portal of St. Seurin and the façade of St. Michael and St. André. Bordeaux is a city which seems to belong to two periods totally unlike each other; the old town is full of old houses, while the new is an epitome of *La Jeune France* with all its ambitious aspirations and grand conceptions.

The usual route from Bordeaux to Pau is by way of Dax, a station on the line to Bayonne. We wished to see Bayonne and Biaritz; the latter of these places I had so often heard described as being magnificent, that I had imagined a bold coast of gigantic cliffs. I was therefore greatly disappointed to find only a pretty series of bays strewn with rocks, which are so grotesque in form and shape that I had no wish to attempt to photograph anything I saw there. The view of the Pyrénées, which we now saw for the first time, was most strikingly grand; but they were too far off in the distance for photographing. I know of no place so well adapted for fine studies of clouds and waves as Biaritz. The following morning found us once more in a diligence; and after a drive of ten hours we arrived in Pau.

Our first walk was to the Place Royale, from which place we were to see our first view of the Pyrénées from Pau. The view which lay below the Parc winds along a wooded and well-cultivated valley; villages and farm-houses are scattered along its banks as far as the eye can reach, to the east and west, while to the south the valley is bounded at a short distance by a line of vine-covered hills, running parallel with the Pyrénées, and extending to the foot of the mountains. Amongst these villages Jurançon is the most prominent, on account of its size and beauty. It is famous for its wines, which have a peculiar flavour, and are said to be very "bad for the headache." It stands at the entrance of one of the many beautiful valleys which open amongst the mountains, and has a fine background of oaks and other lofty trees, which separate it from the hills immediately beyond. These hill are covered with vineyards, and clothed with the richest vegetation. At a distance of 20 or 30 miles beyond these hills rise the majestic Pyrénées.

Far surpassing in the beauty and sublimity of its outline all the other mountains of this range as they appear from Pau, is the Pic du Midi de Bigorre, which stands out in the most commanding situation, with a fine background of rugged peaks and snowy pinnacles running to the south-west, and connecting it with the general chain. Next in importance to this mountain (the height of which is 9721 feet) is the Pic du Midi de Pau; and perhaps no one of the range appears more striking when seen for the first time. From a mass of irregular and broken pinnacles of no great elevation, it rises like a mighty cone with a cloven summit, on one entire side too steep for the snows to rest. It is a remarkable feature in this mountain that it catches almost every passing cloud; so that when higher ranges are perfectly clear it is often wrapped in mist, and never looks finer than when the vapour forms a sort of belt around it, while its cloven crest is seen towering into the sky. At the foot of this Pic you catch a view of a misty valley, with purple rocks rising in bold dark forms on either side, and extending far up into distant heights of untrodden snow. This is the valley which leads to the Eaux Bonnes and Eaux Chaudes; and it is called the valley d'Ossau, as meaning the valley where bears come down.

The general aspect of the château of Pau is more venerable than picturesque, though recent restorations are destroying its marks of antiquity. It appears at first sight to be composed of a pile of irregular roofs and towers, standing out so as to command the most extensive view of the heights and valleys by which it is surrounded.

There are not many subjects suited for photography in Pau itself. The mountains are so far off, and so white with their eternal snows, that it is next to impossible to get anything like a satisfactory picture of them.

During the winter months I took a few views in Pau and its immediate neighbourhood, occasionally taking my camera to the small towns and villages which were within easy distance of us, such as Morlaas, Lescar, Nay, and Orthez.

Morlaas is celebrated for a fine old church, which stands in a narrow street. I managed to get a view of the remains of its principal entrance, which is one of the most splendid portals I ever beheld. Of gigantic proportions, circle within circle, each elaborately carved with figures, foliage, and intersecting lines, this magnificent doorway presents a treasure to the antiquary as well as to the artist.

Lescar, the situation of which is remarkably fine, is a short distance from Pau; and, like almost all the towns in this part of France, the glory has indeed departed from it. The church, which is of great extent, is now under the course of restoration. I took a view of its

round chancel in a hurricane of wind and rain.

The little town of Nay, situated at the foot of the mountains, is about 10 miles from Pau. There are a few picturesque little bits to be got in its dirty streets. I only took one view in this place, which by no means gives a good idea of the style of the town. No sooner had I finished the exposure of the picture in the camera, than the sun went in, and rain came on and drove me away.

Orthez is famous for its castle and bridge. The former is not suited for a photographic picture, the latter, with its fine arches and "ivy-mantled tower," is as fine a subject as the most ardent artist could desire to have. I was unfortunate with my pictures this day, having got a very bad sample of gallic acid, with which I spoilt them all. We were now in the month of March, and determined to get a little nearer to the mountains, which the snows allowed us to do in some places, while other places, which we much wished to see, were still blocked out to us and all mankind. We took a carriage to Bétharram, where we stayed to photograph the bridge over the Gave de Pau. It consists of one simple arch, but the festoons of ivy with which it is adorned constitute its chief merit as a subject for a picture. Here we met with a Scotch gentleman, who was staying in the hotel at which we changed our horses and carriage. He told me that the previous morning he had taken a walk among the hills, and feeling tired went into a small hut to rest, where he found two gendarmes with a peasant. They sat and talked for some little time, when the gentleman rose and bade them good morning. The gendarmes rose too, and told him that they could not so easily part with him, and "congratulated themselves on having at last caught him." Of course he required an explanation, which they at once gave, by informing him that he was an Italian refugee, and not only that, but an assassin into the bargain. He assured them he was no such thing—that he had never been in Italy, and was moreover an Englishman. They demanded his passport. It was one granted by the Lord Provost of this city, and described him as a Scotchman. In it he had placed his permis de chasse, or game certificate, granted to him in France, in which he was described as an Englishman. This the gendarmes at once perceived, and pointing out this grave discrepancy to him as a most suspicious circumstance, demanded an explanation of it. He assured hem that Scotland was a little town in Engand, that he came from it, and was therefore both a Scotchman and an Englishman. This they were quite prepared to believe, but still clung to the idea that he was an Italian. The peasant, therefore, and one of the gendarmes, kept guard over him, while the other rode off to the lieutenant of the gendarmerie, who arrived just before it was dark. He was then reexamined, and his statement as to the position of Scotland being perfectly satisfactory, they bade him good evening, and recommended him to find his way down the hills again as soon as he could.

[To be continued.]

MACCLESFIELD PHOTOGRAPHIC SOCIETY.

THE Members of this Society, the establishment of which was noticed in our April Numbers, have continued to meet during the season; and on several occasions very interesting papers have been read, some of which have appeared in our columns.

A numerously-attended Special Meeting was held on the 14th instant, for the transaction of business connected with the practical working of the Society, at which, after hearing the statements of the Secretary and the Treasurer, with regard to its present position and prospects, some minor changes in its arrangements were agreed to, and a Committee was named to carry out an object towards which some steps appear already to have been taken, viz., the organization of an exhibition of photographs, &c., under the auspices of the Society, in connexion with the annual exhibition about to take place at the Government School of Design. Pictures for the exhibition will require to be forwarded to F. M. Mercer, Esq., the Secretary, before the end of the year, and the exhibition itself will probably open during the first week of January.

Regulations for the Reception of Works for Exhibition, January 1859.

1st.—The Exhibition to consist of photographic productions of every description.

2nd.—All photographs to be mounted, and if possible framed.

3rd.—All photographs to be numbered, and a label to accompany each picture, stating,

Artist's name, residence, subject, process.

4th.—Photographs to be forwarded to one of the following agents, viz.:—

London—Mr. Squire, 95 Bishopsgate Street, E.C. Birmingham—Mr. Dowler, Cherry Street. Manchester—Jones and Parry, 23 Mosley Street. Macclesfield—Mr. F. M. Mercer, Market Place; Mr. C. R. Jesper, 8 Mill Street. "For the Secretary of the Macclesfield Photographic Society."

5th.—The expense of carriage of photographs

between the above agencies and the Exhibition will be defrayed by the Society.

6th.—All photographs to be delivered at the above agencies on or before the 3rd of January, 1859. By order of the Council,

F. M. Mercer,
Honorary Secretary.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

Two Main-Points in Photography.

By Mr. Paul Pretsch.

[Continued from p. 65.]

II. *Photography subject to the Press**.

We all know perfectly well the history of the monks,—how they became the keepers of science and classical writers; how they have rendered, as keepers, a great deal of good services; but we also know very well how jealous they have shown themselves against the invention of the printing art; how anxiously they have tried to remain exclusively the keepers of science and classical writers, and how eagerly they have used their influence to prevent the diffusion of knowledge by any other means than their own.

But the monks have been not only the keepers of science and the classics, they have been also the copiers of these works, and many of them became authors. Knowing very well the power which is attached to real or assumed knowledge, they liked to remain the exclusive proprietors of the means to bestow this power. However, the invention of the printing art was not to be checked, although the inventors and promoters of it experienced no remuneration, and had to encounter troubles, difficulties, and even serious dangers.

It was the problem of the fifteenth century to give birth to several events, so important to the cultivation of mankind. The invention of typography, and the discovery of America, gave rise to new ideas; the human mind became elevated, and the thoughtful spirits of our race developed themselves more free, meditating about the truth of old stories, and trying to penetrate the mysteries of eternity. The consequence has been, the Reformation and the heavy struggles of it in a war which lasted more than thirty years, and which inflamed the nations of Europe.

Having delineated, in these few introductory remarks, the influence of important events upon the human mind, and upon the progress of cultivation of mankind, permit me to observe, that we possess, even in our present time, similar events. The introduction of railways has caused the necessity to invent the electric telegraph, and the invention of photography has originated the vehement desire, the universal feeling of the necessity, to invent a method of printing its startling and wonderful productions by printers' ink, to make them as durable as our printed books and engravings, for the purpose of becoming enabled to show to our successors what we have done in this branch.

Like printing in general, as a mere art of copying, has produced reforming effects upon the minds, so might, perhaps, any practical mode of printing photographs produce reforming effects upon the art, and make the same as popular as we have never dreamed of.

In fact, the press, which has done so much for enlightening the minds of the human race,—the same press which has developed itself as an additional power in our society, and which occupies such a predominating position in matters of politics and education—this press ought to be remunerated by making photography subject to it. And this is a noble intercourse too. The light of intellect which has been spread over the world by the press, can only compensate the services of the press by making the real visible light, the sun, subject to the same.

Printers' ink and paper have stood the test of time for many centuries, and with printers' ink and paper, printed in ordinary printing presses, ought to be multiplied the productions of photography. The photographer himself ought to become an author.

These sentiments are well known since the invention of photography; they have been felt by many people, by many learned men, by many more or less successful operators. At present it remains only to ascertain the question, in which mode it can be carried out most convenient, most practical, most useful.

Continuing our ideas, we are easily led to the conviction that we want for this purpose

* Read before a Photographic Society in England, and illustrated with a rich collection of plates, specimens, &c.

an *engraved plate*. Now, what are the means of producing an engravod plate to print from? They are: the skill of the human hand and mind, guided by experience; and for carrying out this intention, there are used either the engraver's tools, invented for this purpose, or the art of etching, or biting in with various descriptions of acids. The first mode depends entirely upon the cleverness of the artist; but even the second mode relies more or less on the experience of the manipulator. No etching is produced at once; each tint requires a separate etching, and any picture, possessing, as a matter of course, a great variety of tints, requires consequently a repeated treatment, resulting in a picture more or less perfect, according to the care and attention bestowed upon it by the manipulator.

But our experience teaches us not to trust too much to the skill and experience of human hand and mind; and especially in the reproduction of an original, drawn by nature, we should certainly like to have engraved the same by the aid of nature too, representing the real touch of the original, viz. of nature or art. The usual modes in which it has been tried to obtain the desired result consist in the application of a kind of coating, rendered by the influence of light more or less *soluble*, more or less *permeable*.

The first mode appears predominant in Mr. Napier's process, using a coating of bitumen or asphaltum (pitch of Judæa), which coating is removed by washing in all parts which have been not at all, or very little, affected by the influence of light. The second mode prevails in a method brought forward in our present time in this country. The coating applied is hardened by the action of light in all the white or transparent parts of the picture, and in all the portions protected it is not, or very little, influenced by the light, and consequently remains more or less *permeable* for the subsequent etching process, or biting in with acid. This is done on a certain plate, being steel, copper, or zinc: in fact, photography is here applied to transfer the picture on the plate, and the well-schooled engraver ought to etch and finish the picture according to the experience of the art of etching.

Like many others, I was very early impressed with a deep sense of the power conferred upon man by the introduction of a method for producing engraved plates by the means of photography. Nature had gone so far in the service of art, as draughtsman, I thought it probable to submit nature to go on a little further, and to become an engraver too. Works of *nature and art*, copied by photography, ought to be transformed into solid printing plates of metal by a process of *nature and art*. The idea arose, whether there is any probability of producing, photographically, a printing surface of *relievo and intaglio* parts, instead of a picture merely made up of lights and shades. This led to the abandoning of etching, or biting in with acid, and the substitution of a photographic coating, adapted for finally obtaining impression-surfaces.

Here appears the distinct difference of my process, compared with so many other methods. If I could have found out some means to transform any positive picture on paper into a plate, to print from, the problem would have been solved, and nobody would have had any objection against the novelty of such a process. In order to make this difference more clear, permit me to state, that for producing an etching, engraving, no matter by what process, a portion of the plate to be etched or engraved must be removed, since it is those very portions of the plate which have been removed, either by the graver or by the corroding action of a certain solution, which constitute the engraving; whilst, on the contrary, I myself, far from removing any portion of my plates, actually make a raised picture by swelling or building up, and produce and manufacture a thick sheet of copper where there was not a single molecule of metal before. I do not engrave or etch a plate previously in existence, I actually make the plate itself, with its marvellous lines or shadowings; a printing plate without scorings, corrodings, or carvings, but built up, plate, picture, and all, by nature's mysterious hand!

I will not trouble you here with a long description of my process, it has been explained in several papers; I will only appeal to the "evidence of eyesight," and place before you a series of plates in the real state in which they have been executed by the process itself. Here is an ordinary glass plate, coated with a gelatinous substance, mixed with photogenic chemicals. The coating has been dried, and has been exposed in an ordinary copying frame, with the original in contact, to the influence of light. In the present instance the original has been an ordinary positive photograph on paper, made a little more transparent by some Canada balsam. However, the original can be also a drawing or print; but at all events it must be transparent enough for the purpose that the light can act through it on the coated glass plate. Very good plates are obtained from originals on glass; but they must be real positive pictures. Practical experience contradicts decidedly the suggestion, published in some papers, viz. to use for this purpose the negative original on glass. It is perfectly

true that an under-exposure from the positive original gives a negative result, and only a sufficient long exposure reproduces from the positive original the required result. Therefore somebody has stated, that a negative original ought to give in a short exposure a positive result. This conclusion is only partially true, because such a picture is a *kind or species* of positive, but it does not possess the required effect. If it rains, it becomes wet; but if it is wet, it has not always rained before.

The time of exposure is extremely varying, according to the transparency of the original, and to the intensity of the light. After sufficient exposure, proved by practical experience, the plate is taken from the copying-frame—the original remaining unspoiled—and it shows a faint negative copy or picture, made up of lights and shadows, on the smooth surface of the sensitive coating. The plate is now placed into a bath, and the picture appears almost instantly, as if by magic, transformed into a raised surface, in which the elevation and granulation of the different portions are in exact proportion to the intensity of the shades in the original picture. It seems as if the effect of light on the film were at once to darken and to harden, so that those portions which have been fully exposed to the actinic rays—namely, the lights of the original—are almost impervious to the liquid of the bath; while in the dark shades of the original this effect has been scarcely felt, and the liquid, entering freely, *swells* the gelatinous compound, and causes the surface to rise.

[To be continued.]

Remarks on the Death of Mr. Howlett. By Mr. Hardwich.

To the Editor of the Photographic Journal.

Sir,—The feelings of regret expressed by the Chairman at the last meeting of our Society, in announcing to the Members the unexpected death of Mr. Howlett, could not, I think, have been understood by any one then present more than by myself. My acquaintance with him did not, it is true, date back further than two or three years; but during a great part of that time we have occasionally been thrown together as fellow-labourers in a pursuit which was very engrossing to us both; and I may say that I have been continually in the habit of receiving from, and communicating to, him the results of various experiments on subjects connected with photography. Those who knew the late Mr. Howlett are aware that his opinion was peculiarly valuable in these matters, and the more so because he did not allow himself to be influenced by any personal considerations, but invariably gave his judgment in an honest and straightforward manner. Rarely did I leave him without feeling that I had carried away something which I could set down in my note-book as a genuine experimental fact. It seemed a pity that his name should be kept in the background on such occasions; and I have frequently urged him to publish what he knew; but he invariably declined doing so, saying that the study of photography was difficult, and that a man ought to be slow in making up his mind, lest he should afterwards be compelled to eat his own words.

The particular department of the art to which Mr. Howlett principally devoted his attention was the reproduction of works of art on a large scale; and those who are familiar with this kind of photography know that it involves an unusual amount of difficulty, and is at times very trying to the patience. I have seen my friend, for instance, working away most assiduously for many hours together, and yet, from some little defect or other in the chemicals, fail in obtaining anything but a partial success. This annoyance he felt acutely, but at the same time expressed himself with confidence that many difficulties would eventually be mastered, and that the science was certain if we could but get to understand it. Upon the very last occasion when I saw him, he suggested that some accurate experiments should at once be set on foot, and undertook to share in conducting them. I sent him a packet soon afterwards, and received a reply, stating that the chemicals had reached him safely, but that he could not attend to them just then, being confined to the house with a cold. Not hearing anything further for several days, I concluded that all was going on well, and did not even think it necessary to call at the house to make inquiries. Imagine then my sensations when, very shortly afterwards, I received an announcement of his death. I was shocked beyond measure, and found it almost impossible to realize it. All that he had shown to me on the occasion of our last intercourse at once recurred to my mind,—his new buildings and arrangements, fitted with every appliance of the most perfect and expensive kind; and yet to reflect that this had been in vain—that there was no continuance in it, and that the experiments he so carefully devised were never destined to be carried out! It was truly a subject for most serious thought; and I felt for my poor friend's loss as I might have done for a relative.

Are we then once more to engage in the occupations of life with those lessons unlearnt, which events of such a kind are intended to teach? Surely not! and although we shrink from making the pages of a public journal a

depository of our innermost thoughts, yet we feel at the same time that there is a brotherhood amongst us as photographers, and that a mingling of our sorrows for a little space will cement our union the more firmly.

An old divine, writing with good intention, has observed that all the pursuits of science and art have vanity marked upon them. "The busy part of mankind," he says, "are employed in multiplying evils and miseries; the more retired, speculative, and curious, are amusing themselves with what will hereafter appear as unsubstantial and useless as a cobweb." Now, what are we to say to these words? Certainly they are only applicable to men who are devoting themselves to their occupation literally with heart and soul. Perseverance and honest industry ought never to be condemned; and where is the object so small that we can say it is a waste of time to give it our attention? *Truth* is superlatively valuable in whatever form we can discover it; and any man who is selected as a medium for the communication of a new fact to mankind may feel happy that when he dies he will leave the world wiser than he found it. We have lost, in poor Howlett, one who might perhaps have done great things for us if he had lived; and from this sad event, which we all deplore so deeply, ought we not to learn a lesson of moderation and forbearance, that we may go on working quietly together—journals and societies and individuals—without permitting that proper spirit of competition, which is only fair and honourable, to degenerate into an unhappy rivalry?

There is one point more which I must not omit to mention before I bring this letter, already extended so far beyond its proposed limits, to a conclusion. The immediate friends of poor Howlett are convinced that in the excess of his zeal he did himself harm by imprudence and overwork. He was so full of enthusiasm and excitement, that, as a companion observes, he appeared to be running here and there and everywhere, and doing in one day as much as most men would accomplish in two or three. And it is a question whether a man does not inflict an injury upon his constitution, and put the nervous system to a severe strain, by allowing himself to stand for so many hours each day over plates, of a large size, flooded with volatile chemicals. There are some photographers so unacquainted with the medical properties of ether, for instance, as to suppose that its continued inhalation in this way is stimulating rather than otherwise. Let them, however, be assured, by ore who can speak from experience in the wards of our London hospitals, that such is not the case. Collodion photography, in the way that an amateur would practise it, is quite harmless; but the professional operator must be upon his guard; for, unless he is a very strong man, he will certainly suffer in the end by continually shutting himself up in small rooms half full of the vapour of ether. The system gets exhausted by degrees; and he is liable at any time to sink into a debilitated state, in which any severe infectious disorder may fasten upon him in a moment. Warnings are then too late; and one more sad instance is given of the truth of the old adage, that Prevention is better than Cure.

PHOTOGRAPHIC CHEMISTRY.

On a Process for Colouring Positives.

By F. Maxwell Lyte.

To the Editor of the Photographic Journal.

Bagnères de Bigorre, Hautes Pyrénées,
Dec. 1, 1858.

Sir,—I see in the last Number of the Photographic Society's Journal, in the notices to correspondents, a process given for colouring positives. This process bears a great similarity to one which I employ, and which I believe to possess some advantages over even the one above mentioned. I therefore have the honour to forward it to you for insertion in your next Number.

The process answers equally well for all kinds of paper, whether albuminized or plain-salted, but it is more especially to be considered in reference to the former, which often obstinately refuses to colour by some of the ordinary processes employed. The paper having been sensitized as usual, and the proof printed, only a little darker than it is ultimately intended to be, it is to be laid in a dish of clean water, and having been well soaked, is to be lifted out and transferred to a dish of salt and water; in this it must lie for at least five minutes, the object being to convert into chloride of silver any trace of free nitrate which the previous bath may have left in the proof. A longer immersion in the salt does no harm, nor does the strength of this bath much signify. A large tablespoonful of a saturated solution of common salt to a pint of water is a very convenient strength. This bath is essential to preserve the gold-bath from decomposition. The proof is now to be lifted from the salt, and placed in the following colouring-bath:—

Terchloride of gold	10 grains.
Phosphate of soda (pure) . .	3 drachms.
Distilled water	1 pint.

Mix.

This mixture should be completely neutral to blue litmus; if acid, it has been made with

chloride of gold, which has not been properly neutralized. As soon as the proof is placed in this bath it changes colour, and passes rapidly from red, through various shades of purple, to a rich black or rather grey; while the green solarized parts, if any there be, darken and develope their half-tones in a surprising manner. The colouring is to be stopped at any particular point, according to the taste of the operator. If it be stopped at the purple tone, the resulting picture, when dry and finished, will be of a rich dark sepia; if at the black, the finished picture will be more inclining to black and grey. From this bath the proof is to be passed into one of pure water, and thence into one of fresh hypo, 20 per cent., where it should remain an hour at least, when it is to be washed as usual. However, after the first minute in the hypo, the picture loses but little in strength, only becoming clearer and more defined. Indeed, so fixed are pictures coloured in this that a bath of cyanide of potassium takes more than twice as long to destroy one of them as it would to destroy a picture coloured by the old process. The principal advantages of this process would seem to be, that the colouring-bath being perfectly neutral, it can produce no decomposing effect on the hypo, whereby a greater security is attained for the stability of the resulting picture. Next, the colour is altogether produced by gold, no sulphur or other substance being present to aid in colouring, and which would render the proof self-destroying; and, lastly, no organic acid exists in the bath, which, if present, would determine in it a spontaneous decomposition, whereby the gold would become precipitated, and the whole rendered useless. Where the above formula is employed, it may be prepared in any quantity, and just the portion taken which is wanted for use, and not returned after using into the stock-bottle. It sometimes occurs that a proof has been very much overprinted, indeed some bad negatives will not produce a good print without great overprinting. In this case a few drops of syrupy phosphoric acid, if added to a portion of the above bath, will be found useful in developing detail in the deeply-solarized parts, but then more care than usual is required in washing the proof before the hypo, which may indeed in itself be mixed with a little carbonate of soda, as recommended in the other process above mentioned, or (which I prefer) it may have a little chalk diffused throughout it. Carbonate of soda acts on albuminized paper, destroying its tenacity if added in too large quantities. This colouring-bath, after being used, is liable to form a precipitate, probably a compound, of ammonia, which it may obtain from the paper if it have been salted with chloride of ammonium; and magnesia, which it obtains from the impurity of the common salt, and phosphoric acid, $2MgO \cdot NH_4O \cdot PO_5 + 12HO$. This precipitate carries down with it a notable proportion of gold. For this reason the liquid, after being once employed for colouring, should not be returned into the stock-bottle, and all precipitates should be preserved for the extraction of the gold they contain. F. Maxwell Lyte.

P.S.—The above process was prepared for publication before receiving the Society's Journal, which has come to hand to-day; but as this letter was already written, I send it for publication, at the same time merely observing, that I hope mine may prove an interesting variety of the process given by Mr. Hardwich. The pictures which I have sent to the Photographic Society of Scotland for exhibition were printed by this process.

I enclose a couple of proofs as specimens.

P.S. Dec. 14.—The phosphate of soda above prescribed may, at the pleasure of the operator, be replaced by 1 drachm of common borax—biborate of soda.

I am, however, disposed to think that such a bath does not act so rapidly as the one above named. It is, however, very alkaline in its reaction, and produces no decomposition, so far as I can find, in hyposulphite of soda, even when boiled with that salt.

On a New Dry Collodion Process.
By M. Belloc. . . .

This process, with the particulars of which M. Belloc has kindly furnished us, is the invention of M. Müller, of Bolbec, a clever chemist, who unites with great experience of all photographic processes, an indomitable patience and perseverance.

First liquid.—Into a deep vessel put

Pure white of egg. . . . 100 grms.

Beat it until it forms a firm froth, and add to this

Distilled water . . . . . . 90 cub. cent.
Creosote . . . . 10 or 12 drops.

Beat the albumen again for three or four minutes, let it stand for eight or ten hours, filter through fine and very clean linen, and keep it in a bottle with a ground-glass stopper.

Second liquid.—Boil for five or six minutes a mixture of

Honey. . . . . 250 grms.
Animal charcoal. . . . . 5 ,,
Water. . . . . 100 ,,

While this mixture is on the fire, mix the white of an egg with 100 grms. of water, and pour the whole into the boiling liquid; let it boil for three or four minutes more, then filter

it through paper, and add 20 grms. of alcohol: it should furnish 400 grms. of liquid.

These two preservative liquids, put separately into stoppered bottles, may be kept for a long time without alteration.

The glass having been collodionized and rendered sensitive, wash it with plenty of water (distilled water if possible), and keep it for a moment inclined at an angle upon blotting-paper; when it is drained, pour upon the stratum of iodized collodion, in the same way that the collodion itself was poured on, a mixture, which must be made at the moment when it is employed, consisting of—

First liquid	20 parts.
Second liquid	10 „

Operate more slowly than in collodionizing the plate; throw away the excess of the first application, and let it drain for a moment; cover the plate with a second stratum, and place it upon the angle by which the liquid has escaped, or else immediately in the slide of the camera.

As a matter of course, if plates are prepared for future use, the greatest precautions must be used to avoid the least access of light during the different operations, which should be carried on in the night, or in a laboratory from which natural light is completely excluded.

To develope the image—whatever time may have elapsed between the preparation of the plate and its employment—it is necessary, before submitting it to the developing agents, to immerse it in a bath consisting of—

Water	100 grms.
Nitrate of silver	4 „
Acetic acid	6 cub. cent.

After this immersion, which need only last a few seconds, the plate may be treated with pyrogallic acid, &c. in the same way as those prepared with wet collodion.

M. Müller has operated with plates which had been prepared for more than a month, and their sensibility was nearly as great as that of certain old or acid wet collodions. The time of exposure in a fine day is two minutes, with a landscape lens of 8 centimetres (3 inches) in diameter; in cloudy and rainy weather the exposure should not exceed four minutes.

It is clear that M. Müller, as a man of experience and an enlightened chemist, has profited by the labours of his predecessors; M. Belloc's hydromelite, combined with albumen, is in fact the most certain preservative of the sensibility of iodide of silver. Albumen alone is too coherent, when employed exclusively and not rendered sensitive, to cover the stratum of iodized collodion; it deprives it of too much of its original sensibility.—(*Cosmos*, Nov. 12, 1858, p. 598.)

Chemistry of Fothergill's Process.

To the Editor of the Photographic Journal.

Sir,—My attention was arrested by the questions put by Mr. Ebbage in the Journal of the 20th of October, respecting the chemical changes which take place on coating a sensitized collodion plate with albumen, and I was glad to see the subject taken up.

It is generally asserted in chemical works, that albumen enters into combination with metals; that on adding a metallic salt to albumen two distinct substances are formed, one a compound of albumen with the acid, the other a compound of albumen with the metallic oxide: the former is usually somewhat soluble, the latter insoluble.

Some erroneous opinions have been promulgated respecting the behaviour of albumen towards metals*. Orfila stated that it was an antidote to poisoning by bichloride of mercury, by converting the bichloride into chloride; but this has been proved to be incorrect†: and no less an authority than Liebig has asserted that albumen combines with arsenious acid in atomic proportions; the experiments of Dr. Edwards and Mr. Kendal proved the fallacy of this statement.

These examples only show the necessity for further investigation of the subject.

As nothing is more important to the advancement of photography as a science than that we should clearly understand the chemical changes which take place in the various manipulations, I wish to draw the attention of our chemical members to this question,—Does albumen enter into chemical combination with the base of nitrate of silver? or are the changes which occur owing to the various salts combined with the albumen generally used in photography, namely, white of egg?

I do not pretend to assert that there is not such a compound as albuminate of silver; but I very much doubt whether the plates prepared by Mr. Fothergill's process owe their sensitiveness to this compound, and I consider Mr. Keene's experiments far from conclusive, from the circumstance that he did not operate with *pure* albumen, but with white of egg, which, according to the best authorities, contains a number of salts, and, among others, chloride of sodium.

Lehmann‡ states, "albumen always retains chloride of sodium with so much tenacity, that it is almost impossible to separate it by washing."

Simon§ says, "albumen always contains

* Pharmaceutical Journal, vol. i. fol. 302.
† Ibid. vol. ix. fol. 524.
‡ Lehmann's Physiological Chemistry, vol. i. fol. 335.
§ Animal Chemistry, by Dr. J. F. Simon, vol. i. fol. 18.

more or less salts—phosphate and sulphate of lime, chloride of sodium, and probably some lactates. Their amount is variously estimated by different chemists; the average is about 4 to 8 per cent."

It appears to me that Mr. Keene overlooked the fact of his albumen containing *chloride of sodium*; and the presence of this salt fully accounts for all the reactions he observed and has recorded. In his last experiment, which he thinks proves the presence of albuminate of silver, if he had added a solution of chloride of sodium to a portion of the aqueous solution of oxide of silver, he would have had an equally abundant precipitate as with albumen; but the latter sooner changes colour on exposure to strong light, which I attribute to the presence of organic matter.

In conclusion, I would suggest whether the superiority in sensitiveness of Mr. Fothergill's process over all other dry processes is not due to a minute film of chloride of silver on the surface of the sensitized collodion, protected from atmospheric action by the coating of albumen.

The question is an important one, and is worthy of a thorough investigation.

A MEMBER.

PHOTOGRAPHIC PROCESSES.

The Dry Collodion Process.

By MR. GEORGE NEVILE.

THE plates must first be covered with a thin coating of albumen (half albumen and half water, well beaten up together and filtered), and then allowed to dry by degrees, in a warm place (not to be dried over the fire). When they are so prepared, they will keep for any length of time; but they have a great tendency to absorb moisture, and must therefore be slightly warmed, and allowed to cool again before applying the collodion, to ensure their being thoroughly dry.

The collodion, which I will describe afterwards, can be applied to the albuminized plates in the same manner as to plain ones, and is much easier to manage, as it runs over the plate without any difficulty; when the collodion is set, the plate can be immersed in a bath, such as is ordinarily used for the wet process (not an acid bath, which is generally supposed necessary).

It must remain in this about double the usual time for wet collodion, and then be washed for a few seconds in a bath containing water made slightly acid with citric acid.

It can then be put away in a box to dry by degrees, or can be dried over a fire or spirit-lamp. I have found no heat I have subjected them to, to have any injurious effect upon them.

Plates prepared in this way will keep good a few days, without any protection whatever.

If it is necessary to keep them for a lengthened period, they must have some of the diluted albumen poured over them once, and drained off before they are dried; they will then keep any time. The time of exposure with a landscape lens will be from three to six minutes; they must then be put into the acid water for a few seconds, and developed with a solution consisting of 3 grains of pyrogallic acid, and two of citric, to an ounce of water, mixed with an equal quantity of nitrate of silver solution; 30 grains to the ounce. The plate will take about the same time developing as an ordinary wet collodion plate. The best method of developing, is first to pour on the pyrogallic acid solution with a drop or two of the silver solution, and keep it on till the picture appears, slightly, of a faint salmon colour: then wash off the developer and mix some more; the reason for this is, that if the picture has been over-exposed, there must be more nitrate of silver solution than pyrogallic acid, and if under-exposed less.

If the picture is over-exposed, the difficulty is to get the high lights intense enough, without over-developing the picture; and as the pyrogallic acid brings the picture out, and the nitrate of silver blackens it, there must be a greater proportion of nitrate of silver than pyrogallic acid; similarly, if the picture is under-exposed, the difficulty is to get the picture perfectly developed, without making the high lights too dense, and therefore the pyrogallic acid must predominate. This is exactly contrary to the directions which are usually given for developing a picture, and which have caused, I have no doubt, as many failures as anything. The plate can then be washed and fixed in the usual manner, and after being fixed with hyposulphate of soda, may be pumped on with any degree of violence without the slightest danger of detaching the film from the plate; this, I am sure, any one must consider a great advantage who has ever been as annoyed as I repeatedly have, by leaving the plate to soak in water, to get out the hyposulphate of soda, and on coming back finding the picture floating about loose instead of adhering to the plate. The advantages which I claim for this process are,—

1st. That when the plates are once albuminized they are as easy to prepare as for the wet process, and that by having a neutral bath instead of an acid one, the operator can prepare his plate as for the wet process, and if he wishes to keep it has only to wash it in the acid water: in addition to this the plates when albuminized may be handled without much

danger, and you have not to rub each plate as if you were polishing a table, just before coating it; which, besides filling your room with dust, is a very bad preparation for making your hand steady for the delicate operations which have to follow.

2nd. That the plates are not nearly so easily spoilt by over-exposure as in the wet process. I have taken two pictures under the same circumstances, giving one three and the other six minutes' exposure, and brought them out exactly the same by modifying the development as I described above.

3rd. That the plates can be developed more easily and quite as quickly as the wet plates, which I believe cannot be done by any other dry process, and which is a most important thing, as I think every one will agree with me that the great drawback to a dry process is the trouble of having to be constantly coming and looking at your plate during development, to see how it is getting on, and finding perhaps at the end of an hour or two that it is overdone.

4th. That there is no risk of the film being destroyed by any amount of washing.

5th. The total avoidance of blisters.

Note 1. *The Collodion.*—I will here describe the collodion.

Every one who has had any experience in taking collodion negatives will know, that when collodion is new it is very sensitive, and adheres tightly to the plate, but gives a picture deficient (for landscapes) in half-tone and intensity; that as it gets older and of a darker colour, it becomes less sensitive and more what is technically termed rotten, but gives better pictures, and in time it becomes so rotten that it is impossible to keep it on the plate during development.

When it is at this stage and useless for all other processes, it is just getting in the right state for the one I have described. I have succeeded best with collodion that has been iodized for a year or more, and which does not get darker than a lemon colour. I have no doubt that collodion could be made, which could be used at once by adding a much larger proportion of alcohol than is usual.

I have found collodion which is too tough to be developed, when dry can be made more porous and spongy, and will produce better half-tones by adding a drop or two of albumen to an ounce of collodion. The albumen will fall to the bottom of the bottle in a coagulated state, and if left a day or two will turn the collodion perfectly colourless, by combining with the free iodine, when it may be drained off for use.

No one seems to be aware of the reason why dry collodion cannot be made as sensitive as wet; it is this:—When a plate is to be used wet after being immersed in the silver-bath, it is withdrawn before the iodide of silver is perfectly formed, and the combination goes on during the exposure of the plate. The iodide of silver is more sensitive at the actual moment of formation than afterwards. This can easily be proved by leaving the plate for seven or eight minutes in the bath, when it will be found to be no more sensitive with the superfluous nitrate of silver left on, than if it were washed off. In all cases where the silver is to be washed off, it is found to be necessary to leave the plate longer in the bath: this must be in order to complete the formation of iodide of silver; or what advantage could there be in it?

2. *The Bath.*—Washing the plate in acid water has the same effect in every way as using an acid bath; it makes the plate less sensitive, and keeps the shadows from fogging during development. When the free nitrate of silver is washed off, it is always necessary to use some acid in the bath, or in the washing before exposure to keep the high lights clear. The reason this is not necessary with a wet plate is, that as the formation of iodide of silver goes on after it is withdrawn from the bath, a minute quantity of nitric acid is liberated which does instead. This will account for plates which have been left in the bath some time, say twenty minutes, almost always giving a feeble, foggy picture when used wet.

3. *The Exposure.*—The plates may be used immediately, or kept for some time. I have used them wet for copying engravings or paintings, which have sometimes required an exposure of two hours. If the operator on examining them, after taking them from the camera, finds that they are dry at the edges and wet in the middle, he must be careful to dry them all over before development, or the wet part will be developed the quickest and will spoil the picture. I believe they are just as sensitive to light when dry as wet, and therefore it is of no consequence to have them equally dry all over, for exposing the plate.

I should recommend each plate being dusted over with a camel's-hair brush, previous to coating it with collodion, to remove any particles of dust.

APPARATUS.

New Light-tight Ventilator.

To the Editor of the Photographic Journal.

7 Wellington Street, London Bridge,
December 3rd 1858.

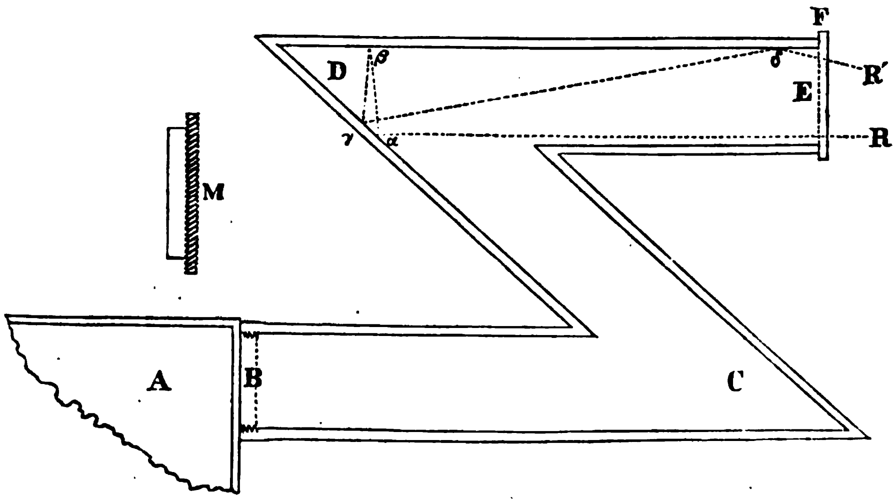
Sir,—I send you a sketch of a *light-tight* ventilator, which I have found very useful. It may be employed for dark rooms or metal

plate-boxes, in which prepared plates for dry processes can be dried, even in sun-light. The figure is full-size as used for plate-boxes, and differs from the one for dark rooms in size and in having one end *tapped* to screw and unscrew at the top edge of the box. A represents a top corner of the lid; at B, a milled cap, M, is screwed on when the plates are sufficiently dry. B C D E is the ventilator, which is capped (like M) to fit on the projecting screw B. At the other end E, it terminates in a rim F, over which some crape or muslin is tied, to prevent the dust from entering. The angles of the elbows C and D are less than 45°, so that a ray of light, R, would travel in the direction of the dotted lines to α, β, γ, δ, and come out again to R′, without being reflected into the tube D C, or into the box.

To dry a box full of prepared plates, it is only necessary to unscrew in the dark room the cap M, and screw the ventilator on instead. (It does not signify if the tube D E is not uppermost.) The box is then put in any warm place, and left there till no more vapour issues from the end E, which is easily ascertained by holding a cold glass plate near it. A thin plate might be coated with some waste collodion, which on evaporating would sufficiently cool it.

It is evident that an angle of 45° would be quite sufficient for the purpose, as the rays of light would then return in themselves; it is also evident that the one elbow, B C D, would suffice. The tube D E, and the acuteness of the angle, are only additional securities.

N. Ennel.



REVIEW.

Three Visits to Madagascar, during the years 1853, 1854, 1856, *including a Journey to the Capital; with Notices of the Natural History of the Country, and of the present Civilization of the People.* By the Rev. William Ellis. Illustrated by woodcuts from photographs. London, Murray, 1858.

We believe, with the exception of the account of the ascent of Teneriffe by Professor Smyth, that this is the first book of travels illustrated for the most part from photographs; and wonderfully does it speak for the beauty and value of our art, and indicates the aid which photography may hereafter render to this species of literature.

We feel that the book is of such intense interest, that it will be read far and wide. We are sure, however, our readers will be pleased to have recorded in their own Journal some of the photographic notices with which the work abounds, and also to know that the author is one of the earliest members of the Society. As contributions to our botanical knowledge, Mr. Ellis gives us views of an African palm tree,—a forest tree covered with orchids, and so wonderfully, that, were it from a drawing, the artist would be suspected of having added to its embellishments; but having had the pleasure of seeing the original photograph, we can bear testimony, not only to the accuracy with which this has been represented by the engraver, but to the fidelity which characterizes the whole work; and we may here observe, that the numerous portraits, though not equal in giving the delicate shading which the original photographs possess, yet show distinctly the characteristic features of two of the races, especially of the Hova, or dominant race.

The picture of the "Traveller's Tree" affords an example of one of the wonderful means of obtaining water in a tropical climate:—

"This tree has been most celebrated for containing, even during the most arid season, a large quantity of *pure* fresh water, supplying to travellers the place of wells in the desert. Whenever I inquired of the natives, they always affirmed that such was the fact; and that so abundant and pure was the water, that when the men were at work near the trees, they did not take the trouble to go to the stream for water, but drew off and drank the water from the tree. Having formerly been somewhat sceptical on this point, I determined to examine some of the trees; and during my journey this morning stopped near a clump of them. One of my bearers struck a spear four or five inches deep into the thick firm end of the stalk of the leaf, about six inches above its junction with the trunk; and on drawing it back, a stream of pure clear water gushed out, about a quart of which we caught in a pitcher, and all drank of it on the spot."

This scene from the truthful photograph is given us. Our author was thus blessed with a plentiful supply of that need to all photographers—plenty of good water. It may be observed that the processes used were the wax-paper for landscapes and wet collodion for portraits; but what photographer does not meet with difficulties? and in his own words Mr. Ellis shall tell us of not a trivial one:—

"I then resumed my preparations for taking the likeness of the prince, who had sent to inform me that he should come in the morning. I had finished all except adding the acetic acid to the developing solution, and the rectifying of the bath; but no acetic acid could I find. The case of chemicals put up by Messrs. Hopkins and Williams was examined again; and all the bottles taken out. Many that I seemed likely to want, and some things that I seemed never likely to want, were there, but neither acetic acid nor any other fluid acid. Every other box or case in which it was even likely to be was examined, but with no better success; and about midnight I gave up the search, and wrote a note, to be taken by a friend to the prince at daybreak, to say I could not possibly take his portrait in the morning. I then examined all my invoices, and to my dismay found no acetic acid there. My friend Mr. Fenton had assisted me to make out the list, and I had the most distinct remembrance of speaking about it at the time; but how it came to be omitted is still a mystery. My perplexity was great; and I am sure all photographers who have been in similar circumstances of destitution in a country where there were no chemists' shops, and no fellow-photographers of whom to borrow, will be able fully to sympathize with me."

Our author had scarcely finished his breakfast when the queen's secretary again came to know when the prince's likeness would be taken; but as the "strong water" could not be found, the operation was delayed and disappointment ensued. After trying to succeed with tartaric acid, the juice from Malagasy limes, and other contrivances, complete success was accomplished by the prince having learnt that it was for the want of an acid, and thereupon contributing a bottle of vinegar.

"The next day I employed myself, when not occupied with visitors and applicants for medicines, in experiments; and in the afternoon, after adding full one-third part of vinegar to the ordinary pyrogallic mixture, I succeeded in getting a tolerably good negative of the young chief who had accompanied me from Tamatave. I also received a note, saying the prince and princess would visit me on Monday."

Our readers will be well repaid by reading the work, which we regret that our limits will not allow us to transcribe. In truth, the whole volume abounds with facts interesting to the photographic reader, written, as it is, by one who has studied nature in all her forms, and practised medicine with success and ability not often to be met with. We cannot refrain from giving, however, an affecting illustration of the social affections among the Malagasy people, in connexion with the portrait of a chief who had died since Mr. Ellis last visited the spot:—

"During my former visit to Tamatave I had had much intimate, pleasant, and affectionate intercourse with an intelligent chief, a native of the capital, but at that time a sort of agent of the prince. Few were the days in which he did not visit me; and it was not until I was in the canoe which was to take me to the ship, that we parted. He had been shortly afterwards attacked with fever, and died a few days after reaching his home. He was a fine, noble-looking man, in the prime of life, about thirty years of age. He stood 6 feet 2 inches high, and told me his father was 2 inches taller than himself. On the same day, soon after the officers from the palace had left me, I was informed that the family of this chief wished to visit me. I bade them welcome; and the father of him whom I used to call *my tal friend*, himself an erect, noble-looking man between fifty and sixty years of age—his mother a matronly woman—the widow of my friend, a healthy interesting-looking woman about five-and-twenty, and five children, al entered my apartments.

"The father seated himself in a chair, the mother and widowed daughter-in-law sat on the ground; the widow carried a little boy in her arms, and the others placed themselves on the ground around her.

"The interpreter, who did not know my former acquaintance with the chief, said, 'Who are you?' The venerable-looking man said, 'I am Ra's father.' He then looked at his wife, and she said, 'I am his mother;' and pointing to the young woman by her side, said, 'This is his widow, and these are his children.' The father then said, 'We have come with a small present in token of our love, for our son loved you, and spoke much of you; we shall never see him again, but seeing you seems to bring him back to our thoughts.' His servants then brought in the present, consisting of poultry, eggs, and rice. I thanked him, and told him that it was a great satisfaction for me to see them; and that I had mourned when I heard of their son's death, but hoped they were comforted.

"I have taken several photographic portraits of this chief while in Tamatave, and after conversing a short time I took out of my portfolio a small likeness of my friend and handed it to the father. He looked at it and wept. The mother took it, pressed it to her lips and kissed it, for some minutes weeping silently, but profusely. A full-length portrait I handed to the widow. She also kissed it and wept, then laid it down, and bent over her baby and wept. I could not restrain my feelings; at length the father and mother both said, 'We are glad to see you, though we weep; we shall never see him again, but we see you. You were his friend, he loved you.' I said, 'Not more than I loved him;'—again they wept."

They paid Mr. Ellis subsequent visits, and received the portrait in a frame—a prize to them beyond value.

We hope Mr. Ellis will, at the approaching Exhibition, allow his admirers to see some of the portraits of the races which he describes, and which, to the ethnological student, will afford much ground for study and reflection.

Of the purely literary merits of this charming book we do not pretend to speak. Their merits are acknowledged by organs of public thought, whose praise Mr. Ellis will more gladly accept than our own. Our business lies with the photographic labours and triumphs of a fellow-worker in the art. On these we have pronounced our view.

MISCELLANEOUS.

Remarks on Miniature-painting.

To the Editor of the Photographic Journal.

SIR,—I have read some remarks contained in the September Number of the Journal, p. 20, respecting the injurious influence which photography has (undoubtedly) occasioned to the beautiful art of miniature painting. I cannot, however, fully comprehend the object of the writer; neither do I consider that the observations are altogether in strict conformity to those which should belong to a Photographic *Journal.*

Now, although (as a very high personage in this realm observed to me) it is quite true that "Photography is better than bad art," yet I confess that I cannot see what the second, third, and fourth paragraphs have to do with photography—that is, as a means of information; the third is *à la Dickens!* the fourth is equally beside the real question in a Photographic *Journal*; and moreover, the whole *spirit* of the observations does not appear to me to be dictated by a *right* feeling. It is, however, true, that in the last paragraph there are some redeeming strictures, viz. that "it becomes a serious question whether we may not lose our miniature painters entirely." I fear that it may be so: and it is really melancholy to think that such an *idle* instrument as the camera should so far supersede Fine Art, as it sets down, with a *sort of malice*, everything connected with portraiture, which consequently requires the aid of art to make it of any real importance in *this* respect. Still there is no question but that it is a great boon to the public generally, by enabling those to whom it would have been otherwise impossible, to have some memento of their friends for almost nothing: this is, therefore, a great *social* advantage.

I have myself been delighted with the wonders and process of photography, and I have done everything in my power to advance it from the first, and perhaps not unsuccessfully; and I am quite sure of this, that it is calculated to aid Fine Art in a very important degree, in the hands of an artist, and one who has passed through such severe labours as are necessary to acquire the principles of art, and also a facility of outline-drawing, as well as of colouring, without which there can be no real artist; but the fear is, *that as idleness is one of the component parts of our nature*, and as it is seen that so much is done by photography without the least knowledge or practice of art, that many may be disposed to forego the necessary application in order to constitute a first-rate artist.

It is a fair calculation, that out of every hundred labourers in the vineyard, at least *ten* would become good artists; but now I think that there will be a graduated scale *downwards*, and that very few comparatively will

be disposed to undergo the severe ordeal of study as respects Fine Art; and this, I repeat, is to be regretted, as it will more or less affect every branch of the art.

Allow me to add, that the observations which have been made respecting Sir William Ross (who, alas! is now beyond recovery), I am quite sure that he never would have changed his mode of practice in his profession; and let me observe, that I consider him to be the best miniature painter that ever lived in this or any country; and with respect to Thorburn, it is a subject of regret that he has left a branch of the profession in which he evinced such great powers. Still I do not agree with the observations made as regards his determination. I have no doubt but that he has taken careful measure of his abilities, and that he will arrive at great eminence in a larger sphere of art, more especially as he is a young man.

Wm. J. Newton.

*** Sir William Newton having felt aggrieved that we had not inserted his communication at the time of its reception, after mature deliberation, we now give it to our readers, leaving it to them to estimate its importance. —Ed.

ANSWERS TO CORRESPONDENTS.

We regret that in our last Number (apparently from the loss of a sheet of the short-hand writer's notes, and also from their being supplied to us at such a late period that it is very difficult to prevent inaccuracies from occurring) it was not stated that Mr. Hardwich's paper was read before the observations of Mr. Ennel were made. Some typographical errors also occur, especially in the report of Mr. Malone's observations: circumstances took place to prevent a proper revision of the press, the funeral of the late Mr. R. Taylor also having taken place on the day usually devoted to the forwarding of this Journal.

A portrait of a gentleman has been received at our office, unaccompanied with any name or description.

Several complaints have reached us of the non-delivery of this Journal; and in every instance where inquiry has been made, it has been undoubtedly posted by the publishers. Members and subscribers would therefore do well to address the post-office authorities thereon in any instance where delay or non-delivery takes place.

A Subscriber (*F. C.*).—Add from 3 to 5 drops of chloroform to an ounce of collodion which is in the gelatinous state that you describe. Probably, if you have had it some time, a little ether may be required. Collodion should stand a day or so after every addition. We cannot recommend particular makers: we have received samples from the same makers, which have varied much, though intended to be alike.

A. J. (*An Old Subscriber*).—Write direct to Mr. Pouncy, Dorchester, who, no doubt, will furnish you with a specimen of his carbon-printing. The pictures exhibited by that gentleman were *not* left in our rooms for inspection and comparison. We cannot inform you of any locality in London where you can see such a print; but, doubtless, an opportunity will be afforded at the approaching Exhibition.

H. D. H.—Your suggestions are in type.

J. H. S.—The picture should tone in about ten minutes; but it is frequently longer. Finish the prints as soon after printing as possible; you will thereby secure better colours.

T. F. H. (*Maida Cottage*).—We must refer you to No. 71, in which an old subscriber asks the same question relative to colouring of photographs. We have always seen success attend those instructions.

The Early Spring.—We never heard of the dark tent which you inquire about. The great fault of these contrivances in general is their high elevation, from which cause they are generally unsteady and disturbed by the wind.

W. Lyndon Smith.—Thanks for your picture of the graveyard, which is certainly one of the most artistic that photography has produced.

E. E. P. (*Sunderland*).—If you refer to Mr. Lyte's communication in the present Number, you will see it is needless to reply further to your questions.

Alfred Keene.—If you look to our last Number, you will see that your request has been attended to.

Enquirer.—Messrs. Hollingsworth's mill is at Tovil, near Maidstone; but you can obtain their photographic paper at almost any of the dealers in London.

W. P. (*Toning-bath*).—Specimens from the toning-bath described by Mr. Hardwich still remain in our rooms. If you take notice of the picture produced during the last meeting of the Society, you will perceive that it is all that can desired. The mode described by Mr. Maxwell Lyte in our present Number also gives beautiful results.

Z. X. (*Dublin*).—The toning-bath described in our last Number may be used for plain or albuminized paper. We believe that the after-application of heat is very useful in securing permanence.

W. H. (*Kilkenny*).—1. We cannot give you the information you require respecting the progress which has been made in the turpentine wax-paper process. Photographers would do well to direct their attention to the many advantages which paper possesses over glass for conveyance, portability, &c.; no doubt, research will enable us to accelerate and improve many of the modes already in use. The late Mr. Archer, in his earliest trials, used paper coated with collodion, and with better results than *he* for a long while obtained afterwards with the use of glass. A paper negative is very portable, and safe for preservation. 2. Write to Mr. Sutton, St. Brelade's Bay, Jersey.

J. Penrice.—1. If you follow the instructions given, success must attend your practice: by sending us a picture we shall be better enabled to judge of the cause of failure. 2. The process described in this Number gives beautiful tones. Specimens will be exhibited in our reading-rooms.

Communications received. — On the Metagelatine Process, by the Rev. C. P. Cleaver, which shall appear in our next; W. G. D.; Juvenis; Inquirer; F. Maxwell Lyte; Egbert Moxham; J. R. Mercer; S. F.; Mr. R. W. Grice, with enclosure, for which thanks are offered; Dr. Wright.

Mr. Baynham Jones' and Mr. Francis G. Eliot's communications shall appear in our next.

All Communications for the Journal should be addressed to the Editor, at the Publishers, Messrs. Taylor and Francis, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 76. JANUARY 8, 1859.

Readers not very sharp of sight may perhaps remark a novel arrangement in the heading of our Journal to-day. We ask leave to call their attention to the fact, and to the reasons which have induced the Council to make it. We are known, in the short-hand of the trade and of society, as the Photographic Journal. Our accounts are kept in this name, advertisements are taken in this name. Our letters are addressed to the Photographic Journal, and it appears with this title and superscription in our columns. Whenever literary or political newspapers do us the honour to quote from our pages, they invariably designate us by this title. To the foreign press, to foreign institutions, and to foreign correspondents we are unknown except by this our brief designation. We ourselves advertise our columns to let as those of the Photographic Journal. In short, this is our name, and we are acknowledged by it wherever that science is studied, and that art is practised, which it is our sole duty to promote and represent. Such being the fact as regards our relation to the world of business and of letters, we have thought it useful, by a slight modification of the type, to bring our head-lines into a more exact correspondence with our accepted public character and name. This arrangement, however slight in appearance and unsubstantial in reality, will prove, we are led to believe, a convenience to the many persons who have business relations with our columns.

The public, as well as our readers, have already been informed by the 'Court Circular' that the Prince Consort visited the sixth Exhibition of the Society at the Gallery of British Artists, Suffolk Street. Our Patron made some suggestions for the benefit of Photographic Science, which it will be the duty of the Secretary to ask the aid of the Members in carrying out, namely, in the preservation by the Society of specimens of photographs exhibited on the present as well as on former occasions.

The Exhibition is now open to the public, and they will no doubt appreciate the beautiful collection there exposed to view.

Our readers must take this timely notice not to engage themselves for the evening of the 20th, as on that day the Council propose to invite the Members and friends of the Society to a *soirée*, to be held in the rooms of the Exhibition.

A Crystal Palace Art-Union is announced, under the sanction of the Right Honourable the Lords of the Committee of Privy Council for Trade, in which an important feature will be a distribution of photographs.

"The works proposed to be included within the sphere of the Society's operations," says the circular of the managers, "comprise pictures, drawings, engravings, sculptures, bronzes, carvings, photographs, enamel and porcelain paintings, as well as selected examples of the higher branches of ornamental art, in which Great Britain has recently made such marked progress, but which still requires such aids as this project cannot fail to afford, and which they will effectually receive from the large and abundant resources of the Crystal Palace."

Photography has done a great deal for the Crystal Palace; we are glad to find the Palace preparing to pay some portion of its very heavy debt to the Art.

The prizes will consist in part of *photographic and stereoscopic pictures.*

Another year has dawned upon us, destined to pass away in its turn, in Time's own unrelent-

ing manner, and to develope its failures and successes; but while we accommodate ourselves to the novelty of 1859, it may not be without interest to look back and note what has been done in Photography in the bygone 1858.

Perhaps the most pleasant feature in our retrospective glance is, that both the science and art of Photography have considerably advanced. It has been successfully employed to delineate astronomical phenomena in South America; and a photographic atlas of the moon's phases has been constructed by Secchi at Rome. In the Parisian hospitals it has been adopted to preserve a record of cases of disease and distortion which present any interest to the physician or the surgeon, and to furnish representations of dissections more accurate and useful to the student than the most highly-finished drawings.

We have had good proof of the facility with which photography can delineate, with wonderful minuteness, the intricate and beautiful structure of microscopic objects. We are told that all difficulties which prevented the application of photograhy to wood-engraving have been overcome; and we can speak in very favourable terms of the photoglyphs of Mr. Fox Talbot, and are very hopeful that the time is not far distant when we shall be able to etch a photograph on copper in such a manner as to leave nothing to be desired.

Of the "carbon process" of Pouncey there seems every prospect of perfectly successful results. We hardly dare to say much of photolithography; it is a tender subject; but after the Duc de Layne's prize has been awarded, we may be able to enlarge.

Dry processes have been industriously studied, and even now have been reduced to such practicability as to give much encouragement to future experimenters.

This short and very imperfect review, while it gives us cause for gratulation on what has been already done, fully shows us the vastness of the field still open to honest and serious study. Let us hope that persevering investigation in 1859 may produce great results, and widen the glorious sphere of our art; let us trust that in future there will not be found a photographer who will lend himself to the production of a picture which can debase the art he practises, but that all will cooperate for its further advancement, and the amusement and enlightenment of the age.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

PHOTOGRAPHIC SOCIETY.

Ordinary General Meeting.

January 4, 1859.

Roger Fenton, Esq., V.P., in the Chair.

The minutes of the last Meeting were read and confirmed.

The Chairman stated that Mr. Turner had expressed his wish to retire from the Council, and, accordingly, they recommended for election Mr. Edward Kater, F.R.S., who was a former and very valuable Member of the Council.

He then asked if any gentleman had any members to propose as officers of the Society in the place of any of those who are suggested by the Council for election at the General Meeting, because, if not then proposed, it would be too late at any future period to do so.

The following gentlemen were balloted for and elected Members of the Society:—Henry Harrison Allan, Esq.; David C. M'Connel, Esq.; J. Wellings, Esq.; J. M. Mackie, Esq.; Andrew Lighton, Esq.; and Captain the Hon. William B. de Blaquire.

Mr. Gutch exhibited a series of photographic views illustrative of geological phenomena, which were much admired.

Dr. Holden, in illustration of a communication, exhibited some specimens of carbon printing, now removed, in conjunction with Mr. Pouncey's specimens, to the Exhibition in Suffolk Street.

Mr. Pouncey, of Dorchester, then read the following paper on Carbon Printing:—

Sir,—Inexperience in the regulation of meetings like the present, stood somewhat in my way at my last appearance before this Society.

As I was not able to examine and reply to many misconceptions, which were partly avowed by certain members, and partly implied, I beg on this occasion to commence my remarks by the four following statements:—

1. That my prints were not sent to the Society in the first instance, until a member of the Printing Committee had solicited me to send them; and correspondence had taken place as to what I would take to give the process up to them.

2. That I never have appeared before the Society or the Printing Committee as an applicant for their bounty.

3. That, after the method of a subscription had been adopted and very nearly carried out, independently of the Photographic Society altogether, to say that I attended the last meeting in order to make some use of the Society, was unjust and absurd. And

4. That my appearance on that occasion was due to an advertisement and pressing Editorial notice which appeared in the Society's Journal, and that my chief object was to ascertain, what I had long suspected, namely, that there were no carbon prints forthcoming to meet my own.

And now, Sir, I wish to make a very few observations to show the fluctuations that have taken place in the opinion expressed by gentlemen connected with photographic interests; the change which has come over their views since the first announcement of my process, according as they have acquired a knowledge of it; to take an instance, on turning to the 'Photographic Notes' of 1st September, 1858, we find Mr. George Shadbolt declaring, that, in his opinion, the whole process must end in failure. In the comments of the same gentleman, upon the proceedings of the last meeting, we find him now, however, asserting that the process "holds out a very fair encouragement for a reasonable expectation of future excellence;" and further, that "it is much to be regretted that Mr. Pouncey had not some negatives better adapted to display his process, as we are convinced that even now it is capable of better results than those he exhibited." I do not mean to say that it was any fault of Mr. Shadbolt's that he should have begun by predicting that my process would end in failure, and ended by as strongly prophesying future excellence. "*A change has come over the spirit of his dream.*"

This has happened with all discoveries. They have been the more warmly opposed, the more decidedly the truth was destined to be rendered apparent; and I cannot expect the carbon process to be exempt from the same ordeal. On the contrary, I am ready and willing to do all honour to those who, having denounced it in the dark, are as willing as Mr. Shadbolt seems to be to acknowledge its merits on becoming enlightened regarding them. But I have one more word to say: Mr. Shadbolt's opinion of September 1st drew from me a private letter to the Editor of 'Photographic Notes,' in which, upon reviewing it, I find embodied the substance of my whole claims on behalf of carbon printing; and I consider these remarks to derive additional weight from the fact of their having been at first quite a private communication between myself and Mr. Sutton, although I cannot now regret that they were published by him:—

"I received yours of August 31st, yesterday. You say you cannot get depth by the trials you have made. I have printed pictures since I saw you with as much depth as an ordinary engraving. I do not pretend to assert that I can obtain all I wish in a picture at all times, but this I do assert, that I have pictures that contain all half-tone, detail, and depth; therefore if the process will give it in one case, it will in another, the same conditions being present. If we do not obtain it, it is, I honestly believe, through imperfect manipulation, which we cannot expect to understand all at once. Again, we know that many persons would not look favourably upon photographs of any kind for years, until their vision had been educated, as it were. Hence arise many objections to photography, even now. Apply the same remarks to carbon pictures, and it becomes a matter of taste, and as we cannot account for taste, such objections are not worth notice."

And as Mr. Sutton, with myself, has been spoken of in connexion with the carbon process, I may here mention that it was after reading in the 'Notes' his description of photographs exhibited in 1858, that I directly enclosed two carbon prints in a letter to him. I had read all that was then being published, the writers of which were perfect strangers to me, but from what I had read I came to the conclusion that this gentleman was the *then* only writer that would appreciate a carbon process. I mention this to account for the origin of my correspondence with Mr. Sutton, —a correspondence induced from no personal or private predilection, but arising solely from my perusal of his writings; and I refer to the progress of Mr. Shadbolt's conversion, simply in order to observe that, whilst I can fully understand the difficulty of grasping at a perfect novelty, which many may feel all but insurmountable, I think I am entitled to caution all those who may indulge in long speeches concerning the carbon printing, or any other process they may not have mastered, of the manifest dangers of being carried away by preconceived notions, and of the propriety of being careful not to warp their minds in prejudices to which the practical knowledge I may myself have attained, and to which I sincerely wish others to attain also, may one day render one and all of us altogether superior. I am free to confess that I know but very little compared with what we all wish to know, and what we no doubt shall know hereafter, in regard to

this and other processes; and, in proof of my assertions, I shall most willingly submit to any cross-examination of what I may state in the course of this evening at any part of its proceedings, and shall be happy to give any explanation in my power. I am here to explain anything in reference to the process, to retract nothing, and therefore I come at once to the cause that instigated my experiments in carbon printing. Having announced my intention to publish an "Illustrated History of the County of Dorset," in which I reside, I could by no means satisfy myself that photographs printed by silver would be permanent; I therefore printed by every variety of method my own brain could suggest, and by every means devised by others, but could not arrive at any definite result as regarded permanency in silver printing. I have photographed on and printed from stone in various ways, and ventured to maintain it in operation throughout the publication of no less than four parts of my "Dorset Illustrated," each part containing no fewer than twenty pictures. Had I supposed, therefore, that carbon printing would, at your last meeting, have reverted into mere photolithography, I could have produced before you a hundred specimens by the side of each one then exhibited.

I believe that no one has a greater prejudice in favour of photography than myself, although I perfectly agree with the statement made at the last meeting that we should have the benefit of all these processes, and therefore I have brought with me this evening several stones in different stages of manipulation, in order that we may first examine, and perhaps arrive at some definite conclusion, on what principle or mode of working we may hope for success in this direction.

These stones are now before you, and I will explain what I mean in reference to them. And if, for the sake of distinction, we speak of a stone process as photolithography, and carbon printing as direct from the negative, we shall not hereafter be confused.

Stone No. 1.—This process was introduced at the last meeting, when the following statements were made:—

"Dr. Frankland thinks that a resinous body is formed by the oxidation of this substance, and it is this resinous substance which enables us to apply the ink, or prevents us washing away the surface where the light has acted. At all events, the parts resisted water, and that is an important thing in the lithographic process."

What parts resisted water?

It is clear the stone will not resist water, nor is it intended that it should; nor will the bichromate solution, how much soever it is or has been exposed to light: perhaps we shall presently have it explained more fully what was meant. The statement proceeded,—"You will bear in mind the process which requires you to put a positive on the stone is a disadvantage for the negative, because there is the double process."

Now, stone No. 1 has a drawing produced from a negative, and you will not fail to observe that the drawing so produced is *non-inverted*. Here, again, there is a mistake; as every one knows, who is acquainted with printing from stone, that to obtain a picture in its correct position it must be printed from an *inverted* drawing, whether that drawing is produced by light, by the lithographer's pencil, or any other means; therefore all persons who have ever worked at a stone process (and you know, Sir, there is always a wide difference between those who work and those who talk only) will find that a negative cannot be worked from with advantage, nor, indeed, at all, without we first turn the film. All workers on a stone process will tell you this is the first difficulty which stares them in the face. What then, I ask, was meant by the statement at the last meeting? It surely could not mean that we required a non-inverted drawing on the stone to print from; if so, we should have inverted impressions. Let us continue our examination: the next step is to pass the lithographic ink-roller over the surface. We will suppose, for a moment, that the picture you see already drawn by light takes ink, which, according to the statement made at the last meeting, would be the case (and here I must beg you most particularly to observe, the ink is not absorbed by the stone, but simply held to the stone by the substance you now see on its surface, which substance *can* be removed by water). The lithographic printer then proceeds in the usual way, and as he proceeds he passes a wet sponge over the stone after each impression, before rolling, to prevent the clean parts of the stone from taking ink; but by this means, the ink not being in the stone, but merely in the substance attached to it, he breaks up the foundation of the drawing in the course of printing. Besides, in the course of operation the drawing becomes clogged, and the only remedy is to wash the stone clean, and roll it up again.

What then becomes of the drawing?

It must be remembered the ink was not originally in the stone, but on it only, consequently his drawing is destroyed. In fact, as soon as the drawing becomes clogged, he must cease to take impressions.

Now let us examine stone No. 2.—Here the

drawing is the reverse of the former. This being the production of a positive, you will at once perceive the drawing is inverted just as we want it, in order to produce non-inverted pictures, or, in other words, as they appear in nature. You will perceive, also, that the drawing on this stone is that on which the light has not acted, consequently the ink is absorbed in the stone, and not by any substance on it, in contradistinction to the former; and, as the printer proceeds, he runs no risk of breaking up the drawing by the application of water to any extent; and if in course of operation the drawing becomes clogged, he can, without hesitation, wash it out in the usual way without the least fear of destroying any part of it. The ink-roller then being passed over the stone, the drawing appears clean again, and the printer proceeds as before. This process has, therefore, a decided advantage over any other, inasmuch as the ink remains in the stone in strict accordance with the principles of lithography, namely, clean ink on a clean stone, without soap or sugar, or anything else; and I have no doubt that all practical lithographers will corroborate my statements. Should any be present, I will thank them to say if I am right or wrong.*

Another advantage is, that if the drawing on stone No. 2 requires touching up, it is easily performed by a sharp point, which would not be perceptible from the other parts of the picture. Not so with stone No. 1, on account of the difference that must always exist between the lithographer's pencil and the substance here used as the vehicle for ink.

I have now practically illustrated to you the principle on which alone we can hope for success; but by no stone-process at present can we obtain impressions equal to direct printing in carbon from the negative; hence it was that I perceived the necessity of prosecuting my experiments further in that direction. To proceed, therefore, I next produced a number of prints in bichromate of potass, developed with gallic acid and protosulphate of iron. By this method I could not produce a clean print; the whole picture partook of an inky blueness. I then mixed bichromate and gum arabic, equal parts, in solution, developed as before, and produced very presentable pictures.

And here again I was sadly disappointed to see, after a short time, unmistakeable signs of fading. Thus I was as far off from accomplishing my desire as before. It then occurred to me, if I could stain the bichromate solution with any colouring matter, so that neither light nor developer should have anything to do with yielding the colour which forms the picture, I might be certain the results would be permanent. Here again I was disappointed. I produced various stains or colours from logwood, beet-root, cochineal, &c., and added others to them, to obtain a rich brown, but could not get sufficient depth. Nor were the pictures I did obtain permanent. I then resorted to carbon, believing that if by this means I produced pictures, they would be imperishable; and the result of one of my earliest experiments I keep treasured up in a portfolio, carefully preserved. Unsightly as it may appear, it gave me hopes (and I still hope that my opponents will one day have the pleasure of seeing it treasured up in the British Museum). I have printed with various carbons; and that which I prefer is vegetable carbon, the same as used for the manufacture of printer's ink. I applied the carbon in various ways, with a view to produce an even surface, but could not succeed until I adopted the method of brushing the surface with a large flat brush. The paper I first used was Marrion's, slightly albuminized; and those specimens first shown here were printed on the back of it. But, although I could produce detail and half-tone, this paper would not imbibe enough of the solution to give depth, consequently I continued to print on various qualities of paper, until I produced the specimens now before this meeting; and as the whole are printed from the same negative, kindly lent me by Dr. Diamond, I should be glad if any number of persons present would say, which they believe to be carbon and which silver.

Those prints are produced on a paper different to any previous specimens. It is not what is usually called plate-paper (that would be too absorbent); nor have I found any of the usual photographic papers give good results. My own definition of this paper is, a slack-sized paper, which I press or prepare (with an apparatus) after it comes from the manufacturer, previous to applying the solution. I have had considerable labour and trouble in reference to paper, and believe this to be an important point of the process, as the specimens now before you will perhaps prove. Having the paper ready, I lay it face uppermost on a flat board or glass, and proceed as follows:—

1. Prepare a saturated solution of bichromate of potass.

2. Prepare a common solution of gum arabic, about the consistency of thin varnish.

3. Prepare vegetable carbon, by grinding it with a muller on a paint-stone or slab, in the same manner that a painter grinds his colours;

* At this part of the proceedings a professional gentleman came forward and perfectly agreed with Mr. Pouncey's remarks.—Ed.

and be careful that it is ground very fine. It is to be ground with water.

4. Mix together equal parts of solutions (1) and (2)—say four drachms of each to the ounce, and then add one drachm of No. 3.

5. Stir the whole well together with a glass rod, and strain it through the finest muslin that can be obtained.

6. Now apply the prepared solution in the following manner:—Lay the paper, face uppermost, on a glass slab, or a very level and smooth board; the glass is the best of the two. Commence coating freely with a broad camel's-hair brush, laying on a copious supply over the whole surface, and then allow the paper to absorb for about two minutes.

7. This done, remove the superfluous liquid thus:—Take a painter's 4-inch hog's-hair "softener," and work it regularly over the paper, with an alternate vertical and horizontal motion, until the whole presents a smooth, even surface, partially dry. The drying may then be completed by the fire.

[Operators will of course have inferred that the whole of these operations must be carried on in a dark room. They should also be informed, that any other method of application, including floating, &c., will prove ineffectual.]

8. Expose in the usual way, varying the time according to light, say about four or five minutes in the sun, and from ten to fifteen in the shade. This, however, will be affected by the intensity of the negative, time of year, &c.

9. On the removal from the pressure-frame, lay the picture, face downwards, in a flat dish of clean water, taking care to exclude all air-bubbles. It will be found advisable to place some slight weight upon the picture, that the back may thus be retained wholly under water and kept free from stains. The time of soaking may be roughly stated at five or six hours; though in some cases of over-exposure pictures may remain in the water for days and come out equally good.

It may be observed here, that when the high lights of the picture appear soon after immersion, the operator may conclude that he has *under-exposed*, or that his gum arabic is too thick—which last fault may be corrected by the addition of a little more bichromate. It is preferable to find the picture developing evenly all over. Each picture must be in a separate dish, and finally washed under a gentle stream of clean water from a tap or a lip cup. Should the margin be not quite clean, pass a camel's-hair brush carefully over it before rinsing from the tap, and, if needful, any parts of the picture, but the best results are obtained by soaking only.

You will perceive, as I have before stated, that the superfluous solution is removed from the face of the paper, so that the sensitive coating being in the paper, the action of the light on the bichromate hardens it in proportion to the exposure. When exposed sufficiently, an outline of the picture is to be seen by transparent light, if the paper has not been prepared too dark. On removing them from the printing-frame, I place each print separately in water, face downwards: those parts not operated on by light come off.

If I find that the black stays on too much, I increase the proportion of gum; if, on the contrary, it comes off too much, I increase the proportion of bichromate. The proportion of carbon is regulated according to the depth required in the pictures about to be printed; the quantity is very small; and care should be taken not to prepare the paper too black, as the usual depth of an ordinary silver print is not so black, nor are the lights so white, as in carbon printing. Hence the mistake that many persons make when looking on a carbon print. If with silver we print so as to produce the same amount of depth that a carbon print contains, the majority of our negatives would leave no whites; and if, to remedy this defect, we were to allow the silver prints to stay longer in the toning-bath, the remedy would be as bad as the disease: I have no doubt whatever but that fading begins here, and continues afterwards more or less according to circumstances.

I may here be allowed to ask, what are the features of a good photograph? I consider them to be depth, detail, half-tone, and pure light. As to what constitutes a good picture in an artistic point of view, is another question. Here, again, have arisen many mistakes in reference to carbon printing. I beg to remind you that it is purely a question of printing, and not one of taste, that we are met to consider this evening. The question of taste or colour, tint, &c., should, I think, form subject-matter for future consideration, as any tint can be obtained by the carbon process. Then, as pure photographs in carbon, do not the prints you have before you contain the features I have mentioned? But, beyond this, the more valuable characteristic is the absolute durability, which characteristic, we cannot fail to observe, all my opponents have carefully kept out of sight.

After all, then, may we not now ask whether photography has not gained a stage in its history, at which, permanency being within reach, it becomes the duty of every photographer to sink all minor differences, and unite in advancing that branch of the science by which alone permanency can be insured? Do not the specimens now before you prove t at

the carbon process is susceptible of overcoming all deficiencies which might at first appear? And, considering the short time that has been allowed for improvement, and the small amount of skill expended, in proportion to that spent by many of the most scientific men for years past, has not the carbon process advanced in every sense beyond any other? It in fact appears to me, from my experience in the matter, to be a question only of manipulation, in which the greatest adept will succeed in producing the best pictures. But this I look upon as by no means the highest estimate which we ought to put upon the carbon process, so long as it is admitted that 80 per cent. of the silver prints are liable to obliteration within a comparatively short period, and that ultimately the whole will become pieces of blank paper.

Here allow me to read an extract cut from a photographic paper, November 26, 1858: Article 'Questionable Subjects for Photography:'

"But there is this consolation, in addition to the almost certain fact that the demand must surely fall off, that the slides so printed will fade; so that what was once a stupid or improper picture, will, in the course of time, become something infinitely better—a slide of white paper."

Here this fact is acknowledged, if not proved. What a waste of photographic labour must this seem to involve, in the face of a process by which absolute permanency is attained without any sacrifice! Were it only for the sake of permanency alone, and for the preservation of the interesting labours of our photographers to future generations, I should therefore say that the carbon process at least deserves a fair trial. You can no longer accuse one of any reserve in this matter; nor would I have withheld my explanations so long, had I been met in a different spirit; but if at the first there were no carbon prints to be seen except those of my own production, for the future it will be your fault, not mine, if they are not forthcoming in abundance.

I have exhibited before this Meeting this evening a number of photographs printed both in silver and carbon from the same negative: the carbon prints are so perfect a *fac-simile* of the silver *prints*, that many present cannot distinguish the one from the other.

I conclude, therefore, that such a demonstration is sufficient proof that the *carbon process* gives results equal in appearance to silver: the difference that exists between a *carbon print* and a silver print is, that one may probably fade, the other remains imperishable.

The difficulty I have hitherto experienced in obtaining the particular kind of paper will not exist in future; therefore operators can be supplied either from myself, at Dorchester, or any of my agents, with all that is requisite. I believe operators will experience most difficulty in obtaining the carbon suitable; therefore I have prepared a quantity, ready for use, in bottles at 2*s.* 6*d.*, each.

The SECRETARY stated that the Rev. Dr. Holden, of Durham, had requested him to read a letter, detailing his experience in Mr. Pouncey's process.

"Durham, January 3, 1859.

"Dr. Holden, understanding that the subject of discussion at the next Meeting of the Society is to be Mr. Pouncey's carbon process, ventures to send to the Meeting the result of some careful experiments he has made upon it.

"He provided himself with every requisite for the process—carbon, paper, brushes, &c. — by applying for them to Mr. Pouncey himself, and strictly followed the printed directions and other hints which were kindly furnished by that gentleman.

"He considers that the process gives excellent results where a broad effect is to be marked, and great strength of light and dark. As yet, however, in the result, there is an absence of middle tint and aërial tone, which certainly leaves room for further improvement, if it be not wholly attributable to Dr. Holden's want of practice in the process.

"He considers the preparation of the paper, as recommended by Mr. Pouncey, to be a matter of great nicety and uncertainty, and that failures will be likely to occur from this cause far oftener than in the common process.

"But the greatest objection to the process, as at present set forth, is that there seems to be no *criterion whatever of the proper time of exposure*. Not the faintest trace of pictures could be discerned either by reflected or transmitted light, in any one instance, before putting them into water; not even when they were afterwards found to be very much overdone. Until, therefore, some alteration can be made in the process by which this last objection can be removed, he considers it to be of but little use to the photographer who is simply desirous of multiplying proofs. At the same time, he thinks that the objections he has mentioned seem by no means insuperable, and that the process, when improved, is likely to become of great value on account of its undoubted permanency."

Dr. DIAMOND observed, in respect to it, that having seen Mr. Pouncey operate, he could detect, in a very dull day, effects produced by the operation of the light, which in Mr. Holden's experiments were not noticeable.

Mr. POUNCEY.—May I be allowed to say one word with respect to half-tones? These pictures are all printed from a negative which Dr. Diamond has kindly lent me, and it cannot be said there is a great contrast there between lights and darks.

A MEMBER.—May I ask Mr. Pouncey if the remarks of Mr. Holden can be satisfactorily answered—that is, whether there is sufficient evidence on the face of the picture of the proper length of exposure in the pressure-frame?

Mr. POUNCEY.—I think Dr. Diamond partly answered that question when that gentleman said he saw me operate.

Mr. MALONE stated that he was the occasion of bringing on this discussion, and that the subject of the

photolithographic process of M. Poitevin was intimately connected with the subject of carbon printing, and made some extended observations on that process, which M. Poitevin kept secret. He further said—I find Mr. Pouncey is still under the fallacy that, because 80 per cent. of the earlier photographs faded, they must inherently fade. But do the present photographs fade? If the present photographs do not necessarily fade, I say, for the present purposes, they are as good as carbon. We are speaking now as practical men; and I say again, in spite of the sneers that have been thrown out about practical men—and I believe I have had as much practice as any man—if we look at it as practical men, and if we are obliged to shield our prints from noxious atmospheres, still they are permanent, though not so permanent as carbon, because they will not stand chemical agents. I showed you some which had been kept in a portfolio which had not faded. I mentioned one which had been kept in a book in the city of London, of which book the morocco binding was completely rotted by the gas, and in that the pencillings of nature are preserved; and I will show to any gentleman a photograph printed in 1844, which looks as fresh and free from signs of fading as any of the present time. That is a challenge: as long as that remains authenticatedly unfaded, we must acknowledge that silver prints do not necessarily fade. Then I am met with the statement that 80 per cent. have gone. We well know that in 1844 we none of us knew the exact amount of washing required. I know now that there must have been a trace of hyposulphite of soda left in every picture of that period, and yet, in spite of that trace, many of these pictures remain; and, if so, what may we not expect with our present skill and knowledge of the past? Supposing for a moment that the carbon prints are equal to silver prints, then is the carbon process likely to be easier in its application than the silver process? After washing it, must we find out that it is done too much or too little? If that is the case, it is inferior to the present mode of printing. If by any case it is possible that the silver shall fade and cannot be preserved, then, if the carbon print will give you delicacy enough, you will use that process, and by no means oppose the use of it; but, certainly, having an eye to all these processes, I am very happy to see their progress, however far the enthusiasm of the inventor may sometimes overbalance his judgment.

Mr. Shadbolt.—Sir, as Mr. Pouncey has made some rather pointed allusions to me, I presume I may be permitted to observe upon them. He says, "*that a very considerable change has come o'er the spirit of the dream*" with regard to me. Probably, if that be the case, he will remember that when I first undertook to publish the remarks that might occur to me in connexion with photography, I stated that I should not be backward in giving my opinion, although I might afterwards have to alter that opinion, because one could only judge by the effects that were then before you, and not of those which might be before you in future. I have ever intended to state candidly my impression at the moment; and it is not because I have thought unfavourably of a process that I should not, when I am convinced to the contrary, admit that my prognostications were not correct. With regard to Mr. Sutton, I regret that I have used his name at all. With regard to a certain gentleman who has been mixed up by Mr. Pouncey in this matter of carbon printing, I think that Mr. Pouncey has experienced far more injury than anything I could have said, or any one else here have done to delay the publication of his process. This gentleman has claimed for the carbon printing process—not up to the present day, but months back—a position fully equal to silver printing in its artistic effects. Now although we have had laid before us this evening some excellent specimens of the carbon process, I cannot yet admit that they are equal to the silver prints of the same subject: they are good, and, as I admitted the other evening, full of promise; but there is an absence of that atmospheric effect which is a *sine quâ non*. Mr. Pouncey has claimed for the carbon process effects perfectly equal to the silver printing. He will excuse me by saying he is under a misapprehension as to the expression "half-tones:" it implies a gradation in every phase from deep shadow to perfect light; and in this [*holding up one of Mr. P.'s exhibited prints*] there is no half-tone; the nearest approach to it is in *that* deep shadow.

Mr. Pouncey.—I produce that picture as containing no whites.

Mr. Shadbolt.—With regard to containing no whites, the half-tone is produced by a slight granulation. Now, in a silver print there is no granulation. In a silver print it is more like a softened wash of sepia or of Indian ink. You will perceive that in this silver print there is, under the arch, a beautiful gradation from deep black to grey. Now, a remark which I recently made, and which I should have made to Mr. Pouncey upon our last meeting, was, that this carbon-printing process offers a very material advantage, provided we can carry out a little more of the manipulatory parts, in consequence of its presenting the possibility of using negatives which we call weak negatives. My opinion is, that it will be found that negatives of that class are the best negatives for the carbon-printing process, and they are precisely those which are the worst negatives for the silver printing. I stated at the outset that I did not think the carbon-printing process presented favourable aspects, in consequence of the material employed—the bichromate of potash. In every species of photography which I have seen in which the bichromate of potash has been used, an exaggeration of light and shade has been presented. Mr. Pouncey has called attention to a statement in a periodical, to the effect that 80 per cent. of photography will fade. I think that that is a remark made in an exceedingly loose manner.

Mr. Shadbolt concluded his observations with some replies to Mr. Malone, and in asking some questions of Mr. Pouncey.

Mr. Pouncey.—In reply I may state, first of all with reference to taking the negative, it is "necessity which is the mother of invention." When I wanted to get a negative, I did not employ a prism; but when I coated a piece of glass, I put it into the camera the reverse way; I then took another piece of glass, and, with some gutta-percha from my pocket, I fastened them together and dropped them down, so that I thus took my negatives as I wanted them. Gentlemen must not think that I am not up to all these dodges. I believe that the gentleman stated at the last meeting, that he admitted that 80 per cent. of the silver prints faded. May I be allowed to ask, how many faded by the side of that one which now remains unchanged in the pencillings of nature? Supposing that there are one or two left, will that prove that silver printing is perfect? I think not. Then I may be allowed to refer here to what was stated by a gentleman. I believe at one of the meetings of the Society he produced a number of prints, and said, "Look at these. I believe that the toning of those prints is due to hyposulphite left in the paper. They have been to almost every climate in Europe, and they are as good now as then, so that here is the greatest puzzle." Can we gather from Mr. Malone's remarks that the hyposulphite is not the cause of fading? Now, with reference to Mr. Shadbolt's questions, I cannot give any definite name for the paper. I should call it a thick drawing-paper which is very absorbent. That [*holding up a print*] is a print which is prepared before pressing, the coat-

quence of which is, that the back is stuck on. The prints *here* are pressed before the solution is put in. The brush is what is called the four-inch long-hair softener, not a badger-hair. I worked first with the badger-hair, and had two badger-hair brushes, one of which was worn, and I found that upon laying that aside and using the other, I did not get such good results. It struck me, as that was so, that a long-hair brush would do it better, and I found it so. Is there any other question?

Mr. Delferrier.—It is not stated what the solution is.

Mr. Pouncey.—Equal parts of saturated solution of bichromate of potash and a solution of gum-arabic: I cannot give you any definite rule for the proportions. I dissolve 1 ounce of gum-arabic in 3 ounces of water; by the time that is dissolved the water is evaporated, and I have been obliged to bring it thin enough. It is a solution of gum-arabic about the consistency of thin varnish; for if you have it too thick, it is more likely to break. The best proportion I know at present is equal parts; and the advantage is in reproducing scarce engravings. Just ask any printseller of London if he has any very old prints; perhaps he will produce one no larger than this, and ask you twenty guineas for it, although it originally only cost a guinea; and you can produce him any quantity.

Mr. Shadbolt.—There is one point that to my mind gives more promise of success than almost anything else Mr. Pouncey has mentioned, and that is, that he finds it necessary to use varying proportions of bichromate with gum, in order to follow up the varying density of his negatives: that shows there is a control.

Mr. Sebastian Davis.—Sir, there seems to me to be a difficulty exactly corresponding with the difficulty of the ordinary photograph, and that is, to entirely remove the sensitive solution from the paper, because the danger seems to me to be in the lights darkening. I may say that some time since I was practically engaged in lithography, and I was then convinced that by no possible means could we get a photograph from the stone for this reason, because there is always the difficulty of filling up the intermediate spaces, and nothing on stone will give the equal gradations of shade presented by the ordinary photographs; and this seems to me to be the insuperable objection.

Mr. Malone.—I have been asked a question, and perhaps I may be permitted to reply. With reference to the hyposulphite of soda, I am sorry that there seems to be a great misapprehension with regard to the present pictures. If the whole of the former ones had faded, yet if we have one, from the year 1844, still containing hyposulphite of soda, it follows that it must be equally permanent, or more permanent if there is none. Now, if this gentleman will just bear in mind that if we have but one print, there is the fact which cannot be concealed, and never shall be, while I have the power to produce that print.

Mr. Delferrier.—It seems to be a question of whether the carbon can be brought up to rival the silver in excellence, and not a question of permanency. We are here to discuss the merits of the carbon process, and not the failure of the silver.

Mr. Hughes.—I think we ought to look leniently at the endeavours, seeing that his process in so comparatively short a time stands so high, and its main merit is that in which our process is the weakest. If, during a few weeks, such a change can be produced in his prints, we may reasonably hope that it may be advanced still further; but even supposing it could not go further, there doubtless would be found a use for it, and it would fall at once into its proper place. I, for one, cannot see why we should not have several different printing processes, as we have different other processes. We have the ordinary calotype, which is beautiful when portraying rusticity, and we have the ordinary wet-collodion and dry-collodion processes *ad nauseam*; but hitherto we have had but one printing process, which is marvellous in its first existence, giving us first the red hue, which we have got rid of; but with it we have got rid of a good many of our pictures too, for I think the fading of a great many is due to the villainous old hypo-bath. In the daguerreotype we had a very perfect process projected and carried out by Daguerre; but that process just wanted one finishing point to arrive at its present excellence, after arriving at which it never moved beyond. It required the film of gold to be precipitated over it, and these pictures are the most permanent which the Art has yet shown. This brings me to notice that Mr. Hardwich almost supplies in his process something like what Fizeau supplies in his daguerreotype. We all expected that it was gold upon which we had to depend for permanency; but it was so mixed up with hypo, and until it was separated from hypo, we could have no dependence. Now, Mr. Hardwich on the last occasion presented a very interesting process, and I dare say that many of us have since attempted to work it out with different degrees of success. We all like albumen prints, and until lately it has been almost impossible, except with some sulphuretting compounds, to get a good deep colour. I do really think that I am not exaggerating when I say that photography has now stood in that position until we had this interesting exposition of Mr. Hardwich's on the last occasion. With respect to the observations of Mr. Malone, I do not think that the silver prints should be so perpetually compared with the carbon. Let photo-lithography and all its subsidiary branches go on; it is the plain direct printing on paper which is the object; and although we may import the Sister Arts into our own, it is quite beside the question.

A Member.—The question resolves itself into two points, the appearance and the permanency. With Mr. Pouncey's permission, when I came into the room, I pointed out all that were silver and all that were carbon; there is therefore the difference of half-tone, which I think depends entirely on the amount of exposure, no matter what the process is. The difficulty, as it appears to me, lies, not in taking the half-tone, but in getting that smoothness by which you pass from one tone to another. In Mr. Pouncey's there seems to be a certain roughness, as though the prints were produced by a sort of continuation of little spots. Permanency is a chemical question, and can only be solved by chemical inquiries. It appears to me that all silver prints have something in them by which they will inherently fade. My theory is, that in all our processes the action of light is not on the metallic compounds, but on the organic matter with which those compounds are in contact. The distinction between inorganic and organic is not sufficiently defined; but you will find that in all cases the action of light is upon the organic matter, and not upon the inorganic matter. In all silver prints then, in whatever way produced, negatives or positives, I regard the picture to be a compound of organic matter and sulphur; and so long as these are united there will always be the great danger of the light and the damp, and other atmospheric influences combining together to oxidize the silver and throw it down in a metallic form, until at last we have nothing but the metallic silver in the paper, forming so slight a layer that all the picture is obliterated. This being the case, I think that the substitution of carbon for silver is a very great step in advance. It may be said that we have organic substances; but there is no substance in nature so permanent as the sesqui-oxide of chromium, which we must take to remain in the paper, and which has been subject to the severe tests of the Photographic Society of Paris; therefore I

think it is our duty to encourage the carbon process. The cause of failing in silver prints appears to me to lie in the fact, that more or less of an acid solution of sulphite of soda has been used instead of the alkaline solution, and in the second place in the atmospheric condition. I cannot agree that the daguerreotype is more permanent, because it has not yet been subjected to the same severe tests that photographs have.

Mr. Malone made some further observations, expressing his favourable opinion of the silver process of printing now in general use.

Mr. Hughes.—As regards permanency, the early daguerreotypes fixed by gold are in endless numbers compared with the numbers that were produced at that time; and the daguerreotype, I repeat emphatically, does not fade; and there are many old daguerreotypists in this room whose greatest yearnings are for the durability of the daguerreotype; they did not sulphurate; a bluish film was sometimes formed near the edge, which was effectually removed by the application of cyanide of potassium, and so, I imagine, would a sulphurizing be remedied in a photograph. Did any one ever try cyanide of potassium?

A Voice.—Yes.

Mr. Hughes.—And what of the print?

A Voice.—Out.

This last monosyllable brought Mr. Hughes to his seat with the suddenness of an electric shock, amidst much suppressed merriment, upon which the Chairman seized the merry moment to remind the meeting that the discussion had been prolonged far beyond the appointed time, and that each side of the question had been fully discussed in their meetings.

The Chairman then stated as follows:—I think it is the feeling of the Society that it is very desirable that Mr. Pouncey should go on with his process, and that all who have the time and means should labour to assist him, but that they will still continue to prefer the silver process, which is most beautiful, ever remembering the proverb, "*that all that is bright and most beautiful must fade.*" I remember, in photographing a manuscript of Alexandrinus, I noticed that all the material with which the writing had been formed, which I may now say was carbon, and which was the general material of manuscripts, had so corroded the vellum, that the letters were only represented by the actual cutting out of the vellum surface, so that even the most imperishable materials have only a limited duration. I am sorry to say that even carbon prints are not everlasting. The precaution taken at the British Museum to ensure the safety of prints is increasing; they are constantly obliged to be brought out to the air, and dried and watched with as much care as little children.

I must now convey to Mr. Pouncey the thanks of the Society for the paper which he has read, and wish him every success.

We have also the promise of a paper from Mr. Pretsch on a kindred subject.

I have now to remind the Society that it is the evening for them to appoint Auditors to audit the accounts of the Society for the past year. I must therefore call upon the meeting to appoint two Gentlemen to perform that duty, according to the regulations of the Society.

Upon the motion of Mr. Foster, Messrs. Heath and Hamilton were unanimously elected Auditors. The Meeting then adjourned to Tuesday the 1st of February, which will be the Annual General Meeting of the Society.

Carbon Printing.

To the Editor of the Photographic Journal.

Society of Arts, Manufactures and Commerce,
Adelphi, London, January 6, 1859.

Sir,—The length to which the discussion ran at the last meeting of the Society prevented me from expressing my views in reference to the specimens of carbon printing exhibited that evening by Mr. Pouncey, in illustration of the paper he then read. I must confess, from what I had seen of that gentleman's productions on former occasions, I was not favourably impressed with the capabilities of the process; but the specimens since produced by Mr. Pouncey, and shown on Tuesday evening, exhibited so marked an advance upon what had hitherto been done, and were in themselves so good, that I am anxious to urge on our Members the importance of turning their attention to the working out this process, now that Mr. Pouncey has given us his *modus operandi*. It is true no portraits were exhibited, nor any landscapes with fine aërial perspective; but after what has been done, there would appear every reasonable hope of the process being rendered capable of succeeding even in such directions.

The prints exhibited were very beautiful; and even should the process never become adapted for portraits, &c., Mr. Pouncey has shown that at all events there is a large class of interesting subjects to which it is well adapted, and in which it succeeds admirably, and is superior, in my opinion, to silver.

Peter Le Nève Foster.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

President, J. Glaisher, Esq., in the Chair.

The minutes of the last meeting were read and confirmed.

S. Knill and H. Williams, Esqrs. were duly elected members of the Society.

Mr. Heisch called the attention of the Society to the subject of mounting photographs. He stated, that though he still thought india-rubber in many respects the best substance for the purpose, because it not only had no action on the photograph, but protected it from the effects of the bleaching substances sometimes left in the mounting board, yet that it had some disadvantages; it was troublsome to use, and if the drawings were brought too near a fire, it sometimes gave way. He was then driven to the use of glue, or some other kind of gelatine, which answers very well; but requiring to be used hot, it is difficult to get it evenly spread on a large drawing before it chills, unless it be

made so thin as to soak the paper and thereby warp the mounting board as it dries.

Having lately been using metagelatine as a preservative for dry plates, he was struck with its excellent adhesive properties, and tried it for mounting; it answered well, stuck as firm as glue, and being used cold could be applied to the largest surface with the utmost deliberation. The solution he employed was made by placing 1 oz. of pianoforte-maker's glue in 10 ozs. of water, with from 40 to 50 minims of concentrated sulphuric acid. When the glue is quite swelled, which takes three or four hours, it is heated and kept near the boiling-point for two or three hours longer, the acid saturated with carbonate of lime (common whiting does very well), and the solution filtered hot; 2 ozs. of spirit of wine are now added, and the whole made up to 20 ozs. If not quite clear, the solution will now filter easily at a temperature of 80°, while at from 60° to 65° it is sufficiently thick not to swell the paper to which it is applied enough to make it warp the mounting-board. The solution will keep for months.

[Since the Meeting of the Society, I find that the heating with the acid must not be too prolonged, that in fact a small quantity of the gelatine must be left unconverted; otherwise the solution runs quite limpid at all temperatures.—C. H.]

Mr. Melhuish exhibited some transparent stereographs from negatives recently sent him by F. Haes, Esq. The negatives were taken in intensely hot weather at Cairo, on plates prepared by Dr. Hill Norris before Mr. Haes left England. Mr. Haes stated that the time of exposure was much longer than would have been required in this country.

Mr. Knill exhibited some large photographs which he had recently brought from Rome, and Mr. James a very beautiful photograph from a drawing.

The meeting then adjourned.

Pau and the Pyrenees, with a slight Sketch of a Photographic Tour made to them through the west of France. By the Rev. T. M. Raven.

[Continued from p. 108.]

After repacking my camera, we returned to the hotel to see whether our carriage was ready. It had been ordered to be in readiness at a certain hour for some days beforehand; but they had not yet caught the horses, which they said they had been "trying to do for some time." As even the "Eastern Counties trains must come in at last," so the carriage was at last announced as being ready.

On leaving Bétharram we passed over the beautiful bridge, and from that point entered the department of the Hautes Pyrénées. Our road now lay through a richly-cultivated valley, with the river running immediately on our right, while on our left was a range of vine-covered hills. About eight miles from Bétharram we came in sight of the curious and ancient castle of Lourdes, which, when seen from this position, has a striking and imposing effect. We intended to spend a few days in this town, on our way to Bagnères de Bigorre, and so passed through it, as we were anxious to get on in good time to Argelez, which is eight miles further. The road between these two places is indeed a paradise, but so entirely composed of richly-cultivated fields, large woods of fir, and mountains towering to the sky, that, to succeed in any detailed description of it would be impossible. We had engaged rooms at the best hotel in the place beforehand, through the kindness of a brother photographer whom we were to meet here, and with whom we were to travel for the following week or ten days. We found everything ready, even to the dark room with its yellow blind, and all things in our favour but the weather, which then became overcast. In the afternoon we had a thunderstorm, which struck us so much with its awful grandeur that we were fully compensated for our disappointment at not being able to take any pictures.

We here met with an intelligent man from Lourdes, who had a pair of horses and a carriage to let, which we took by the week, and had no cause to repent the bargain we made with him, except that we had now and then a little difficulty in making him take roads which we wished to see, and on which he did not wish to go. He knew the neighbourhood well, and was able to point out to us many places from which fine views were to be obtained, which otherwise we should never have seen. Trout, eggs, and mistletoe-thrushes, with tough chops, we had in abundance at this our first resting-place. It was early in the season; and little else was to be had; and very good too they were: but to see nothing else for days but the same dishes, varied only by the succession in which they were produced, with wine which, the further we got, seemed to become more sour, is not quite so pleasant to those who are disinclined, even when travelling, to dispense with home comforts. We had that morning parted with all such ideas, and made up our minds to live on whatever we could get. Our only difficulty in Argelez seemed to consist in demolishing a sufficient quantity to please "mine host," who replaced everything we took as soon as it disappeared, and followed us out of the house afterwards to ask us "whether we had really done," and, if so, when we "should be ready for another meal."

I am sorry that I have no view of Argelez to show you. My developing-bath once more went wrong, and so I failed. I had, by mistake, taken from Pau a small bottle of the same gallic acid as that I had failed with some time before at Orthez; but with it I had another bottle, which served me till I returned to Pau, and with which I had no more failures.

The first fine morning our carriage was at the door at an early hour, and we started for Cauterets, passing through Pierrefitte, which we determined to make headquarters, as being more conveniently situated, and in the midst of finer scenery. We drove up therefore to the door of the Hôtel de la Poste, which is a handsome-looking house, and, as we afterwards found out, a very comfortable one. The doors and shutters were all closed, and long and loud were our knocks and calls for admittance. The bells on our horses had already collected a crowd, when a portly woman was seen making her way through it with a bunch of keys in her hand. We soon found that she was the maitresse d'hôtel, and ready to learn our wishes and show us the house, which had been closed for months. Our only fear was damp beds; but this she assured us we need not fear, as she had well-aired beds at her own house, which we should have. We fixed on our rooms therefore, and told her we should be with her the following evening.

On leaving the house, we found four horses in our carriage, into which we at once got. Crack went the whips, some twenty or thirty more bells adding their jingle to those we already had. In making our week's bargain for the carriage, we stipulated that we should have no bells, but found a compromise all we could accomplish. If we would consent to bells in and out of a town, coachee would consent to take them off when we were out of it: to this we consented, and kept him to his bargain till he fastened the bells to the collars of the horses in such a way that he could not or would not undo them again.

We began immediately to ascend the almost perpendicular side of a red craggy mountain. The road all the way to Cauterets was excellent; the same may be said of all the roads in this part of France. On one side were lofty masses of rocks extending to a vast height; on the other an inaccessible height, and beneath us a noisy stream, thundering with its snow-waters over fallen trees and huge blocks of rock. Towards the conclusion of our journey the scene grew wilder still.

Cauterets consists of three or four streets, chiefly composed of hotels and lodging-houses, which, with one or two exceptions, were all closed. The only hotel that I saw open was that at which we stayed for a few hours. A good deal of snow had fallen among the mountains that morning and the previous night; and we heard that the road to the Pont d'Espagne and the Lac de Gatibe was impassable. I only took one view in Cauterets, as we determined to return to Argelez in good time, so as to take one or two pictures on our way back; I took two views on this road, one of a stream a short distance below Cauterets, and the other of an avalanche lying in the river, or rather by it, as the river had washed its way through it.

The following morning we went to Luz, took one or two photographs there, and returned to Pierrefitte. My friend was going into Spain the next day, and was anxious that I should join him in a short excursion there; but I could not tear myself away from the place in which we then were; besides which we determined to return to Luz, and from thence pass on to Gavarnie. I prepared several sheets of sensitive-paper for him, placed some of them in his dark slides, packed the undeveloped negatives he had that day taken in his case, and bid him good-bye.

[To be continued.]

Two Main-Points in Photography.

By Mr. Paul Pretsch.

[Concluded from page 111.]

II. *Photography subject to the Press**.

All the tints of the photographic original are reproduced, by a brilliant and wonderful *granulation*. This granulation is a peculiarity of my process, and it is indispensable for the reproduction of any tint by a printing-plate. We can only print from a plate in lines, or from a plate where the picture is represented in more or less fine and closed granulation. It is not sufficient for an intaglio printing-plate to represent the picture in sunk portions, but these sunk portions must consist either in sharp lines, or in a granulation, for the purpose of catching and holding the printer's ink. This required granulation is formed by my process itself, and a contemporary of mine has felt the importance of this granulation so much, that he was compelled to produce the required granulation by artificial means, by applying on the coating of the plate the dust of a resinous substance, well known by the engravers under the name of aquatint.

This beautiful granulation renders valuable services in the reproduction of the various tints of photographic originals, as well as of any originals executed in Indian ink, sepia, &c.

* Read before a Photographic Society in England, and illustrated with a rich collection of plates, specimens, &c.

But if the original consists in lines, as, for instance, in a pen-and-ink drawing, or in an impression from an etching, the copy appears also in lines perfectly corresponding to the effect of the original. In some instances, by the application of a certain manipulation under higher temperature of the air than usual, I have obtained the picture on the coating of my glass plate, *sunk*, instead of raised; this peculiarity is also mentioned and included in my patent, but I have found the first mode more effective, and have adhered consequently to it, without abandoning the other one, to which I might perhaps return in future.

It has been suggested in some paper, to make with pen and ink a copy of a photograph, for the purpose of serving as original for my process. Such proceedings appear not only injurious, but absurd; since the beautiful granulation is perfectly capable of reproducing the tints of the original if they are in existence, but from a vague undecided original, I certainly cannot reproduce a brillant engraving.

Continuing the "evidence of eyesight," I have the honour to place before this respected Society one of my coated glass plates, with the raised picture on it, as it has been produced by the process just described. Everything is done by nature, and it would have been perfectly impossible to add or remove anything by human hand. If you will examine this plate with impartial feelings, I think you may confirm my conviction, that there is nothing more wanted at present, as even the transformation of such a plate into solid metal to print from. And this transformation *has* been executed. Here is a mould in gutta-percha from the picture on the coated glass plate, and a faithful mould too, showing all the tender portions of the first plate, as well as the stronger ones. But this mixture of gutta-percha with some greasy substance is not the only one to be used. According to circumstances, mixtures of wax, pitch, stearin, resinous substances, &c., can be successfully applied.

The picture on the glass plate is raised, in the mould, consequently, the same appears sunk or intaglio; so that, were the material suitable, the mould would be fit to print from. In order to obtain the ultimate printing-plate in copper, a double electrotype process is necessary; a process which, although not very new, is nevertheless one of the wonderful inventions of our present time, of our contemporaries.

Galvanism, the younger sister of electricity by friction, is contained perhaps almost in everything of the universum, in the earth, in the air, in the water, in our body; it has been submitted in our present age to serve for manufacturing purposes, meanwhile, its more spirited relation, the light, is obliged to serve for enlightening the minds of men by taking representations of art and nature.

This power, which is able to decompose water in its constituent substances, which sends messages round the world with more rapidity than light itself; which is apt to change common iron, at a moment's notice, into a magnet if the chain of the galvanic battery is closed, and to take off again this magnetic power immediately if the chain of the battery is interrupted—this power which boils, and melts, and prepares, in the interior of the earth so many precious and valuable metals—is also fit for depositing metals out of their solutions: and this property of galvanism has been applied in my process, to make a cast of copper without heat, without melting the copper.

The same process is well known in electro-silvering and gilding, with the only difference, that the purpose of electro-plating is to cover the given object with a thin layer or film of metal, which ought to adhere and to remain on the object. But in the process called electrotype or galvano-plastic, the deposited metal ought not to adhere, the process of depositing the metal is continued a longer time, till the deposit is as thick as we require; then we can take it off from the mould or original, representing, of course, a faithful copy of the original.

This marvellous gift of nature is used in my process for the purpose of making the required copies in copper. It is well known that all the metals are more or less good conductors of electricity, and also carbon, but gutta-percha, and similar substances used for moulds, are neither metal nor carbon; therefore those moulds must be made conducting, at least the surface of them. This can be done by plumbago, by bronze powder, or by a film of silver, with which the surface of the mould is prepared, and, in such a state, surrounded by a wire or band of metal, the mould is fit to be placed in the electrotype apparatus for the purpose of obtaining by deposit a firm sheet of metal on it.

Here is a such sheet of metal obtained from such a mould; it is the reverse of the mould, therefore, like the picture on the glass plate, raised, and is called the matrix, because it serves for the purpose of making the intaglio printing-plate from it, by repeating the same process of electrotyping. You have here such a printing-plate, and therefore you have the various states of the complete process before you. I may only add, that nothing at all on these plates has been added or removed; they are in the same condition as produced by the process,

and, consequently, you are perfectly able to judge what the process can do.

Any person conversant with the electrotype process, will be perfectly aware how certain we are by these means to obtain a real faithful copy of the original. As an instance, permit me to mention, that if we touch the mould or the bright surface of the matrix by the finger, and obtain by doing so an impression of our skin on the polished surface, such an impression is faithfully reproduced by the electrotyped copy. Therefore we ought not to be afraid of the complication of the process, because the same process of moulding and repeated electrotyping is applied, in the nature-printing process, in multiplying engraved plates of maps and of bank notes, under circumstances where there is indispensably required the utmost accuracy and faithfulness.

In fact, this mode of producing engraved plates by means of photography and electrotype, is a combination of processes, which requires that each portion of the process be carried out perfectly; each part must do its duty for obtaining the ultimate result. The first part of it is a photographic process, it forms not only the picture, but it reproduces the picture in the required lines or granulation, and the subsequent parts of the process are only the means of copying the first plate for the purpose of obtaining a suitable printing-plate. Copper is not a precious metal, but it is certainly a very valuable one for all technical purposes, as all experienced practitioners know perfectly well; and, at all events, it is preferable and safer, to posses an engraved copperplate than a mere drawing on stone. Moreover, we can make at a moment's notice a transfer from such an engraved plate on stone, which will be mentioned here presently.

The process has also the advantage of consisting of several distinct operations which are independent of one another, and most of which may be performed at any intervals of time that may be convenient. The original photograph need not be used for months after it is taken; the coated glass, even with the picture on it, may be preserved, with care, for a great length of time; the mould will keep almost for ever, and the copper matrix will yield any number of precisely similar plates. The gelatine and the chemicals are comparatively inexpensive, and the glass plates may be used over and over again any number of times. The most costly part of the process is therefore the electrotyping, which expenses vary, according to the thickness of the plate required, from $1\frac{1}{2}d.$ to $4d.$ per square inch.

Two objections have been brought forward against my process by some people who like to reject by reasons which are not always very impartial and sincere. Permit me to speak about these objections more plainly.

The first objection is, that many of my plates require to be touched by the engraver, and this has been stated as a crime of mine, done secretly and concealed.

Now, it appears to me ridiculous to accuse me of a crime which is committed in the present time constantly by photographers who take portraits, so many years after the invention of photography: portraits are touched up generally. Moreover, I know one of the first copperplate printers in London who is constantly engaged in mounting photographs, because he possesses such a peculiar and very nice *sort of glue*, which answers so well for mounting photographs. I will not speak of the high qualities of *this glue*, but by "evidence of eyesight" I can only observe, that I have seen some photographic landscapes which had shown unmounted many faults, which faults, however, have been not perceptible after having been mounted with this *very admirable glue*.

As a sincere "*pater peccavi*," having been convicted of his crime, I can now only confess that many of my plates have been really touched. It is so; the engraver has touched up, in many cases more than it was necessary, more than it was wished for. This has been done in many instances against my will, for I had very little or no control over the engraver in the publications of the late company. But as a small proof of my sincerity, there are before your eyes a few impressions from plates absolutely untouched, and, moreover, I have deposited, out of sincere respect to this country, and as a record of what was really executed a few years ago in this country, in the British Museum, a series of impressions of untouched plates. They are deposited in the print-room of that national institution.

Speaking about "touching up" I am obliged to beg your kind permission for making a few more observations. You see here some copies of drawings which are not touched, but only some dirt removed, which has been on the plates in consequence of some fault of the electrotyper. I consider them almost perfect. I have sent for instance, an impression from the pen-and-ink drawing to the artist himself, and he has declared his acknowledgment of every line done by himself. And I am almost bold enough to believe, that if Raphael d'Urbino were still alive, he would be a more favourable judge of my productions than many people of the present day: therefore, concerning the copies of drawings, the matter seems to be settled.

I must advance now to the copies from photographic originals, and in this case I must confess, that the successful application of my invention will be bounded by the same limits as those which circumscribe the power of photography itself. A subject which is not well adapted for photography cannot give a good photo-galvanographic picture. You are at fault in the first stage of the process, and the subsequent operations will do nothing but repeat the original imperfections. I cannot reproduce an engraved plate, as required by the taste of the public, from an original which has an undecided definition. There are so many photographs with a veil over certain portions of their details; the public is content with those undecided parts, because they are covered by the fascinating rich tint of photography, and because they allow to the imagination of the examiner free play for his ideas. But the public is not satisfied with this undecided definition in an engraving; they will see, and know, and understand, what there is represented: therefore only perfect originals with clear definition ought to be used in my process.

In many instances the capability of being able to touch up is of great advantage; who would not like to remove a stain from an otherwise brilliant picture? Before rejecting the picture altogether, he will certainly first try to remove the stain. Why shall we not give a tint to the sky, where there is generally the sky white in a photograph? Some of the plates do not require a single touch, though many have to be cleaned and rubbed down before they are in a fit state to print from, and some are very much improved by touching up here and there. But the greater part of the work is done when the plate comes out of the electrotype apparatus, and a plate which would take the engraver a twelvemonth of unremitting labour to execute, can be turned out by my process, allowing ample time for any touching up that may be wanted, in a few weeks, with trifling expense, and particularly so in comparison with hand work. Thus the mere saving of highly-skilled labour is immense, and what is of more consequence, the touch of nature's own finger is preserved, and an accuracy is attained to which any mere mechanical skill must of necessity be inadequate. I can and will not compete with the brilliancy of the engraver's tricks in steel engraving, but I can compete in every respect in truth and faithfulness. The main point is to apply as little touch as possible, and if indispensable, to apply the same JUDICIOUSLY.

The *second objection* which has been brought forward against my process by some people who are ignorant of every practical process in the printing arts, consists in the peculiarity that my plates do not allow a sufficient number of impressions. I am perfectly able to prove that this objection is also not sound.

1st. In the present time almost all the engraved plates are executed on steel, consequently the printer is more experienced in the handling of steel plates. The process of "wiping" the plates ought to be done in such a way that it is not like "grinding" the plates. Even in keeping engraved copperplates, the necessary attention ought to be paid, for the purpose of protecting the plates against the injurious influence of oxidizing air. By neglecting this last point we can spoil the plate to some extent, and lose fifty good impressions at once, and by the want of the required attention in the first point, we can lose some hundred more. I have met with some instances where I have obtained, from similar plates, several hundred impressions more by one printer than by another.

2nd. Everybody conversant with the process of electrotyping knows perfectly well that we are able to produce by this process hard, or soft, or brittle copper, according to circumstances. Therefore, besides the necessary cleanliness, the utmost attention ought to be bestowed on this part of the process to produce the required quality of hard copper.

3rd. It is well known to some experienced men in the technical arts, that there is in existence a process for hardening electrotyped plates, and this process is especially executed at the Ordnance Map-office at Southampton, by which means those copperplates are hardened to a considerable extent, and stand at least some thousand impressions.

4th. There exists now a new process of covering copperplates with a very thin film of iron, and of making them by these means capable of yielding almost as many impressions as from steel plates. I myself do not yet possess any experience in this process, but I do not doubt at all that it is a considerable improvement for engraved copperplates.

5th. A very practical advantage can be obtained, by making from those copperplates transfers on stone. By this mode we keep the copperplate always in a good state, and print only from stone. A great number of impressions can be obtained in this way; and although the impressions from stone are perhaps a little less perfect than would be from the original copperplate, nevertheless this method will answer in many cases. In conclusion, will you permit me to present you with some impressions obtained from a transfer on stone? I may also add an impression from a small intaglio copperplate, and I shall be most

happy if you will accept these trifling things as a token of my gratitude for the kind attention with which you have listened to my observations concerning practical matters.

My invention has been called "Photogalvanography," because it is a combination of a photographic and of a galvanographic or electrotype process. I do not think that this name is improperly applied; however, if you should prefer another name, I would rather suggest the name of "Nature's Engraving." But still the name is no point of great importance to the future welfare of my process; a great deal more important to the process is the favour of the public, of connoisseurs, and of all the promoters and protectors of progress. I humbly wish that my process may experience less jealous and less narrow-minded views than those of the monks in the middle ages.

*** During the discussion it was pointed out "that the least satisfactory part of the process was the mere mechanical moulding in a plastic substance, subject to all the defects of such a process." To this I can only reply, that the process of moulding is not so defective as supposed, because some of the finest steel-engravings, even engraved plates of banknotes, have been copied in this mode. The Imperial Printing Office in Vienna, as well as some of the largest firms in London, using electrotype for this purpose, have practically experienced this. P.

OPTICS.

On a Method for Adjusting the Chemical Focus of a Lens. By F. Maxwell Lyte, Esq.

To the Editor of the Photographic Journal.

Bagnères de Bigorre, Hautes Pyrénées,
Dec. 24, 1858.

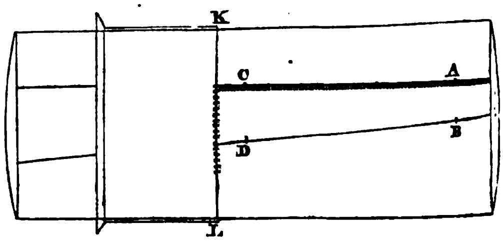
Sir,—In the last page of the Photographic Journal, vol. vi., L. B. describes a method for adjusting the chemical focus of a lens, by means of a focimetric arrangement of his own invention. Now the whole plan, though very ingenious, is tedious in its application, as it requires a separate experiment to be made in order to obtain the adjustment for each distance. I am about to describe a mode by which we may, by two very simple experiments, adjust the relation between the optical and chemical foci of any lens, for any and every distance whatsoever. In order to this object, we must begin by adopting the two following axioms:—

1. The distance between the chemical and visual foci of a lens (which possesses a chemical focus) increases as we approach that lens to the object on which it is focused, and diminishes as the lens is withdrawn from that object. This may of course be ennunciated in another way, if we say that in proportion as the focus of the lens grows longer, the distance between the optical and the chemical foci increases; and as the focus grows shorter, so the distance between the optical and chemical foci diminishes.

2. This increase and diminution of distance between the foci is regular and constant, and may be exactly represented by two straight lines converging towards one another.

I am about to show the way in which two such straight lines may be traced on the tube of a lens, and how by means of them, the visual focus having been found, the chemical focus may be calculated.

Let us adopt the focimetric arrangement of L. B.—a better could not be made for our purpose—and having placed the camera in position, at a distance of 6 or 8 yards from the No. 6 of the focimeter, let the lens be turned in by its rack-work, but not quite to its greatest extent (say within half an inch). Now focus for No. 6 by moving the back of the camera, not the lens; and, once adjusted, let the camera-back be fixed in its place, and mark the point to which



it comes—as when used with this lens it will always have to be fixed in the same point. With this view a line may be drawn across the board on which the back of the camera slides, with some sharp-pointed instrument. Now take a picture of the arrangement to which the camera is directed, and should the lens possess a chemical focus, No. 6 will not be the sharpest in the photographic image, but another number, either nearer or farther off than 6, will come out instead. Suppose this number to be 1, turn in the lens till No. 1 comes to the visual focus, and with a pair of compasses measure off the distance through which the lens has had to be turned in so doing. This is obviously the distance between the visual and chemical foci for this lens, placed at the distance we are from the object; and if we desire to take a picture of No. 1 at this distance, we have only to focus for that number, and then turn out the lens through the distance which we have measured off by the compasses, *i. e.* till No. 6 would come to the focus. Now bring the lens in again till No. 1 is at the focus, and

on the inner sliding-tube of the lens; and in the line K L, where the edge of the outer tube of the lens cuts the inner one, mark off two points A B, letting the distance from A to B be the same as that which we have just measured off by the compasses, or the distance between the visual focus for No. 6 and the visual focus for No. 1.

Now move the camera up close to the focimetric arrangement, say to 6 feet from No. 6, and turn out the lens till No. 6 comes to the focus, and once more repeat the operation of taking a picture; and let us now suppose that No. 4 is the figure, which this time comes out sharp on the plate, and again measure off as before the distance with the compasses between the visual focus of No. 6 and that for No. 4, and again point off this distance by the points C D on the inner tube of the lens, and where the line K L now comes, *i. e.* at the edge of the outer tube, care being taken so to place the point C that a straight line drawn through the points A C would fall perpendicular to the line K L. Let the inner tube be now taken out by dismounting the lens, and rule two straight lines upon this tube from end to end, of which the first cuts the two points A and C, and the second cuts the two points B and D.

These two lines are the lines required. The lens is now to be once more mounted and fixed on the camera, and the rackwork turned out to its furthest extent, and the part of the outer tube of the lens which is comprised between the two lines is to be divided at the edge into a number of small and equal divisions, say 40ths or 80ths of an inch, and the straight line which passes through A C is to be divided into a series of exactly similar divisions. Now if we are to take a photographic picture with this lens, all that is required is to fix the back of the camera in the place marked, and then focus on the object, and having read off on the outer tube the number of divisions comprised between the two lines A C and B D, turn out the lens for a similar number of the divisions of the line A C, and the chemical focus is adjusted.

It may be objected that all lenses do not turn in and out far enough to allow of the employment of this method; but it requires very little ingenuity to understand how the same method might be applied to the back of the camera, the board on which it slides having a brass plate let into it, traced with the lines A C and B D, and A C subdivided as above, and the sliding part of the camera having a brass plate attached to its lower part, and similarly divided.

F. Maxwell Lyte.

On the Distortion of Large Lenses.

To the Editor of the Photographic Journal.

Bedford Street, Plymouth,
November 25, 1858.

Sir,—As a professional photographer of fifteen years' standing, allow me to say a few words on the distortion of large lenses caused by their representing more surface of an object than the pupil of the eye can. Now, it must have struck most persons that the image on the ground glass does not betray this great distortion that partial theory would lead us to expect, but the contrary; we must purposely look for defects to see any of the kind I am alluding to. Photographs are not the things to look at for proofs, but the image of the lens itself. Now, the reason is that the eye is not perfectly stationary, but moves with the head, which instinctively moves when viewing objects, and the effect on the retinæ is the combined effect, and not the one that would result if the head was placed in a vice. Besides, what one eye does not take in the other does.

T. Reeves.

A few years since, this Journal published my explanation of the cause of the relief in the stereoscope, previous to which very curious notions were entertained by many on the subject. I there showed that it was the result of our experience that objects which gave a dissimilar image in the two eyes belonged to a solid object, whereas surface always gave a similar image in all respects. The stereoscopic picture presents those essentials, and the eye is deceived. A mechanically formed picture can never be true enough to do the same, if constructed for the purpose. That the appearance of solidity can be produced by stereoscoping ordinary prints, I hold to be an error. Any picture viewed through a lens has a certain relief given to it, as we have all seen in our boyish days in the penny peep-show. If we mount two right-hand views of an object and place them in a stereoscope, they have much more relief than mere perspective would give them. I send you two stereographs of Plymouth views, and defy any person to produce that binocular effect from any mechanically-constructed picture.

N.B.—The pictures were taken by the dry process, time 8 seconds, stop $\frac{5}{8}$ths of an inch, month August.

T. R.

Adaptation of Diaphragm to Portrait Lenses.

To the Editor of the Photographic Journal.

Cliffe Cottage, near Leeds.

Sir,—Perhaps you will excuse my trespassing on your valuable columns while I endeavour

to describe a very simple mode of inserting a diaphragm of any size between the lenses of a portrait combination. My attention was drawn to this subject some time ago, by seeing the complex contrivance of Mr. Lake Price; and having shown my plan to several gentlemen, they have adopted it, and prevailed upon me to attempt to describe it for the general benefit of photographers.

It consists of two thin rings of metal placed nearly together, and equidistant between the lenses; these form a guide for the diaphragm when inserted through a slot cut partly across the inner tube in which the lenses are mounted, and of course between the rings. A piece is then cut out of the outer short tube on which the pinion is fixed (the pinion being turned to the bottom, and this piece being cut out at the top), which allows the projecting portion of the diaphragm, when in the inner tube, to slide freely, and also permits the changing of the diaphragm without moving the lenses.

The cutting described in noway injures the mounting of the lens, and can be easily applied to any portrait combination at a very trifling expense.

H. R. Smyth.

[Although we have inserted our Correspondent's communication, there does not appear to be any important variation from the mode of applying diaphragms described by Mr. Waterhouse in our Number for July last.—Ed.]

CHEMISTRY.

On Printing with old Collodion Nitrate Baths.

To the Editor of the Photographic Journal.

Sir,—Most photographers wish to use their old nitrate baths, after evaporating to a suitable strength, for printing: now, however well they may succeed with albuminized paper, although even then there is a slight want of brilliancy, these baths do not at all answer for plain paper, the pictures printed being dull, cold, and foggy, and toning in the sel-d'or bath to a disagreeable slaty hue. In endeavouring to rectify this, I was led to the use of citric acid, from knowing its effects in retarding reduction in the parts least acted upon by light, and also from its imparting a warm colour. I commenced therefore by adding this acid to the bath, when to my surprise it immediately began to precipitate, which ceased after a small amount had been added, a further addition causing no further precipitation. After filtering, I floated the papers, when, as I expected, they printed clear and brilliant; however, I found that although they toned to a rich purple when the gold bath was very active; if it was not so, there was great difficulty in subduing the red colour imparted by the *free* citric acid; I therefore neutralized with aqua ammonia, when a further precipitation of a light flocculent deposit took place, which appeared to fill the bottle, but which when filtered out was very little. Upon now floating the papers, they printed and toned to a dense neutral black, and took the gold readily. As, from the alkaline nature of the bath, there was a danger of the papers when sensitized not keeping in warm weather, I added about two drops of nitric acid to the pint of bath, which then worked all that could be wished. As I was anxious to know what these precipitates were, especially the first, which appeared of a heavier and more granular nature than the second, (upon adding the acid to the bath) I commenced by washing it, placing in a test-tube and adding strong aqua ammonia, when a very minute portion dissolved, and almost the whole fell to the bottom of the tube. Upon pouring off the ammonia, washing and boiling with nitro-hydrochloric acid, the precipitate assumed the curdy form of chloride of silver, and the vapour of chloride of iodine was very perceptable to the nasal organ; pouring off the acids and washing, it of course entirely dissolved in ammonia. Had I had any benzine, it would, I believe, according to a correspondent of the 'Chemist,' have dissolved and separated the iodine from the chlorine, which would then have been perceptible to starch paste. The second precipitate, which, on account of the bath having floated many papers and become slightly discoloured, was of a pale green colour and had decolorized the bath, was placed in a test-tube and entirely dissolved in ammonia, all but a very minute amount of black powder, which appeared to be semi-reduced silver mixed with organic matter; the liquid assumed a dark blue colour, similar to the bath when it has been long in use. The first precipitate was thus no doubt iodide, and the second citrate of silver.

To rectify an old bath for printing, therefore, proceed thus. Evaporate to about 50 or 60 grs. to the ounce, add citric acid in solution, any strength, until precipitation ceases; then add ammonia until the reddened litmus is restore to its proper colour, filter, and afterwards ad nitric acid, two drops to the pint.

I may mention that the paper I use is the papier saxe, prepared by the gelatine and Iceland moss formula of Professor Hardwich, and, I think, from the large amount of gold which it quickly takes up in the sel-d'or bath, offers at least a chance for the permanency of the pictures. Francis G. Eliot.

PROCESSES.

Observations on the Metagelatine Process. By the Rev. C. P. Cleaver.

To the Editor of the Photographic Journal.

Sir,—In sending you the enclosed account of the dry process, with which I have been working with uniform success all this summer, I do not wish to lay claim to anything new; but I send it with the hope of leading more persons to try Mr. Maxwell Lyte's process, and with a view to induce photographers to endeavour to improve, or at least experimentalize, in a process known to be successful, rather than in trying all sorts of new preservative syrups, as brown sugar, raspberry vinegar, treacle, golden syrup, glycerine, &c., with which we are inundated *usque ad nauseam*.

I do not think that even now I should have troubled you with this, had I not been repeatedly asked by some of my photographic friends to publish it; and, at the risk of being tedious, I shall do so in detail, as it is only in the manipulation that one process essentially differs from another.

Having tried a good many preservative mediums, I consider the choice to lie entirely between albumen and gelatine, and I will give my reasons for preferring gelatine. 1st. It does not act upon the nitrate of silver, or rather, nitrate of silver does not act upon it as readily as it does on albumen. 2ndly. It is not coagulated by silver or heat as albumen. 3rdly. It is more readily obtained, more easily prepared, makes a more uniform solution, keeps longer when prepared, and is cleaner to work with. And lastly, as I am convinced that both gelatine and albumen only serve as a varnish, and to enter into the pores of the collodion (unless the albumen is actually dipped into the sensitizer), I can see no one advantage that the albumen possesses. Fothergill's process is merely mechanical, and depends entirely on the collodion and the washing, just as much as the gelatine process does.

And now, after this long exordium, I will describe the plan I have adopted.

First, after thoroughly cleaning as many plates as I wish to prepare, I put them into an oven till they are quite dry. This is to prevent blistering, which is generally caused from dampness in the glass. I have never had a blister from a glass thoroughly dried. If the plates are cleaned with old collodion, it is not necessary to dry them; but if dilute nitric acid or cyanide is used, it is quite essential. When the plates are dry, take them and put them in a plate box with the clean faces all one way, ready for use. Coat and sensitize as usual. Use a perfectly neutral 30 or 35 grain bath, in porcelain or glass. The collodion ought to be non-contractile, stable, and colourless. I append a formula. Ponting's collodion, when it is three or four months old, is very good: use no collodion that has iodide of potassium in it, or that discolours with keeping. The gun-cotton ought to be made from acids at a tolerably low temperature; the film should run easily, but not be watery, and after sensitizing should not be too creamy, but tolerably transparent. When the film is creamy, there is apt to be a loose iodide of silver formed on the surface of the silver when drying. In trying one or two Bland and Long's plates, the whole of the image dissolved away with the hypo in fixing owing to this; but I obtained a partial and imperfect picture in the film by redeveloping.

After sensitizing, drain for the same length of time as you would in taking an ordinary wet negative, then plunge it into a large vertical bath of pure distilled water (a gutta-percha bath to hold about 50 grains is what I use), leave it in till you have coated another plate, and put it into the sensitizing bath; then wash it by means of the dipper in the distilled water till the water flows evenly and smoothly from it. Next coat the plate with the gelatine solution, which may be done either in another gutta-percha vertical bath (made just to hold the plate) filled with gelatine solution, or else by pouring it on at one corner and letting it flow freely over to the other: do not hold the plate at the corners, but balance it on the fingers, so as to prevent any of the gelatine running from the fingers across the plate, which is a constant source of streaks and dirt.

For stereoscopic plates I prefer a vertical bath, to hold about 10 ozs. of gelatine solution; this will coat 18 to 20 plates without being at all discoloured, if the plates are properly washed in the distilled water; and the plate can be left in while you take No. 2 out of the first bath, and put it into the second, and till you coat a third plate for the sensitizing bath. When this is done, take the first plate out of the gelatine bath, drain it on blotting-paper, and when it has thoroughly drained, place it in an oven between 120 to 180 degrees of heat till it is thoroughly dry. It is then ready for use, and will keep any length of time.

Exposure.—Stereoscopic pictures of buildings in full sun with 4½ inch Ross, ¼ stop, 60 to 80″.

Landscapes in shade 2 to 3 minutes. It is always better to over-expose, and not under-expose, as there is no tendency to solarization, and the development can be stopped at any moment.

Development.—Wash in bath of warm water

90 to 100°, then wash the plate thoroughly under a tap or other means; finish with distilled water. Begin the development, with a very small quantity of nitrate in the developer, and increase as the picture appears. Never, if possible, go on with a discoloured developer. Over-develope rather than under-develope; but fix with cyanide, and not hypo. The developing will take from 3 to 5 minutes. Wash, dry, and varnish as usual. The development can be done either on the hand, in a dish, or on a pneumatic holder; I prefer the latter.

Note.—By this plan of vertical baths and dipper everything is more uniform, and the plate is seldom or ever in contact with the fingers,—only, in fact, in moving it from one bath into another. As a general rule, the collodion ought to be 3 or 4 months old. If it is too new or too thick, it will never produce a good picture; the older it gets, the more washing it requires, and it is more liable to stains. It ought to be very sensitive. When the collodion gets very watery, add new collodion. Collodion which I prepared and iodized in May with the formula I enclose, is perfectly colourless and very sensitive now. Keep a piece of granulated zinc in the stock bottle of collodion; this will prevent liberation of iodine. Some collodions require ½ a grain of nitrate of silver per oz. in the bath of distilled water; but as a general rule, I find the best pictures are produced without; and though some collodions will produce pictures (and tolerably good pictures too) by merely pouring the gelatine solution on after draining, without washing, yet as a general rule they are not so sensitive, very black and white in the result, will not keep so well, and have a tendency to turn brown at the edges. With some collodions it is impossible to obtain a picture at all under this treatment. The nitrate only unites with the gelatine, and forms an insoluble yellow film over the iodide film, which makes it less sensitive.

Apologizing for trespassing so much on your space, I must now conclude. I am giving the results of a great number of experiments. I have taken above 200 stereoscopic negatives this summer; and with an Ottewill's dark plate box have taken 17 good pictures out of 18 plates one day, and 15 out of 15 the next. My average of exposure during the summer was 70″ to 80″, but I have taken likenesses in 60″ with it.

C. P. Cleaver.

Collodion for 8 ozs.

Methylated ether	3 ozs.
Sulph. ether	2 ozs.
Alcohol	3 ozs.
Gun-cotton	20 grs.
Pyroxyline	15 grs.

Iodizer.

Iodide cadmium	15 grs.
Iodide ammonium	15 grs.
Iodide calcium	10 grs.
Bromide ammonium	20 grs.
Alcohol	3 ozs.

About 1 oz. iodizer to 4 ozs. of collodion.

Gelatine Solution.

Citric acid	1 gr.
Nelson's gelatine	1 oz.
Distilled water	1 pint.

Boil till it ceases to set, then filter, and add distilled water till it makes a pint again.

If it still sets, use Maxwell Lyte's formulæ.

Gelatine Solution for keeping.

Add 10 minims of alcohol and ½ a grain citric acid per oz.

Developer.

Pyro. acid	20 gr.
Citric acid	2 gr.
Alcohol	3 drams.
Distilled water	16 ozs.

Nitrate for developing 2 to 3 grains per oz. of distilled water.

Add ½ a dram to every 4 drams.

MISCELLANEOUS.

Focusing Glass:—Stereoscopic Camera.

To the Editor of the Photographic Journal.

Cheltenham, November 30, 1858.

Sir,—Can you, or any of your readers, give me any good and substantial reason for the ground side of the focusing glasses of cameras being almost invariably placed inwards? I have frequently put this question to photographers, and they have, without exception, agreed with me that it is a mistake. There are several reasons for reversing its position; for instance, the much greater facility for focusing, there being no reflexion from the roughened surface. Again, in the event of an accident, you are by no means sure of procuring another glass of precisely the same thickness, especially on the continent. Having broken my glass in Venice, I was obliged to substitute a plate of nearly ¼ inch in thickness; and had my camera been made on the usual construction, I must have shifted the lens more than ⅛th of an inch every time I focused for a fresh view; and in using the focusing eye-piece described in your last Number, the focus would require alteration for every different camera, whereas by the simple plan of placing the ground surface outwards, all these difficulties would be avoided..

I am desirous of obtaining a binocular stereoscopic camera; but all I have seen are very defective. The two lenses are upon the same plan; and the consequence is that you have portions of each picture not common to both; and if you place the lenses at an angle in order to obviate this difficulty, the image becomes much distorted. Allow me therefore to call the attention of opticians and photographers to this matter, which in my humble opinion is of very considerable importance, in the hope that some means may be devised for curing the defect.

BAYNHAM JONES.

Even Films of Albumen on Large Plates.

To the Editor of the Photographic Journal.

SIR,—To those of your readers who may still practise the old albumen process, the following method of obtaining an even film, especially on large plates, may be acceptable. I have seen no description of it yet in print, but I have lately seen it used in practice by a very successful operator, and can bear witness to its efficiency.

The apparatus required is a prismatic plate-holder, which is so contrived as to revolve on a vertical pivot, or any other similar contrivance for giving the plate a rotatory horizontal motion, and in the second place a wooden tray, a trifle larger than the plate to be prepared, the upper edges of which are rebated to receive a clamped deal cover which is lined with flannel. At the four angles of this tray are fixed triangular blocks of wood, so as to support the albuminized glass in suchwise that its upper surface shall be about $\frac{3}{8}$ths of an inch beneath the under surface of the cover, when the latter is dropped into the rebate.

To operate, the plate is first placed on the revolving holder. and some iodized albumen poured on the centre of it. The operator now breathes on the glass, and at the same time gives a gentle rotatory motion to it, which causes the albumen to flow tranquilly towards the edges; when these are reached by the liquid a quicker motion is given to the plate, so that by centrifugal force the excess of albumen flies off at the four corners. When the albumen ceases to fly off, the motion is stopped, and the plate is covered by a film, which is slightly thicker at the edges of the glass than it is upon its centre; it is now disengaged carefully from the plate-holder, and dropped into the wooden tray, disturbing the level as little as possible, and rests on the supports at the four angles. The thickness of the film in about a minute partially equalizes itself; and whilst this is going on, some glacial acetic acid is poured upon a sponge, by means of which the flannel lining of the cover is as quickly as possible saturated, and the latter is then dropped (flannel surface downwards) into the rebate. The space between the cover and the surface of the albumen plate is quickly filled with the vapour of acetic acid. The albumen is thus in a short time coagulated and becomes opalescent on the glass; and when the action of the vapour appears to have ceased, the plate is lifted out of the tray with a silver hook and the cover replaced (after a renewal of the sponging with fresh acid) over a second plate, which has in the meantime been coated. On leaving the tray, after undergoing the acid vapour treatment, the albumen surface, though coagulated, is by no means dry, only it has become too solid to run into varying thicknesses, and is in fact in the condition of a thick jelly, and the plate may be thrown out of level and freely handled without danger. It is now placed in the tray of a bain-marie, and quickly dried at the heat of boiling water and stowed away for use. Glasses 20×16 inches may thus be prepared and dried at the rate of eight or ten in an hour, as the operations succeed each other rapidly; and though at first sight the process may seem rather expensive, the consumption of acetic acid is not so great as might be supposed.

I am told that some of the most successful foreign operators on albumen use this method in preference to the old system with drying boxes, from the rapidity with which they are enabled to prepare their plates.

A propos to this process, may I ask how it is that in so many chemical works it is stated that acetic acid does *not* coagulate albumen. I have repeatedly tried adding glacial acetic acid to pure uniodized white of egg in a test-tube, and always with the same result, viz. the formation of a white precipitate.

EGBERT MOXHAM.

Method of Mounting Waxed-Paper Negatives on Glass, and Varnishing them. By THOS. BELL, F.R.S.

HAVING completed the waxed-paper negative as usual, I take a piece of glass without flaw, such as would be employed in the ordinary glass processes; then, having made some thin starch, such as I use for mounting positives, I wet the surface of the glass with the starch by means of an ordinary painter's brush, taking care that the whole of the surface is evenly wetted. The negative, having been previously cut a little smaller than the glass, so as to leave about the eighth of an inch margin all round, is carefully laid upon the wetted surface,

and pressed close to the glass as it is laid down, so as to remove all air-bubbles; it is then to be well rubbed on in every direction with a silk handkerchief, that the contact may be complete. It may now be dried, by setting it up in front of a fire, and, when *perfectly* dry, it is to be varnished. The varnish I use is the ordinary turpentine mastic varnish; it is to be applied with a rather stiff brush, and well rubbed on to every part of the surface; and, when this is evenly and uniformly done, it is to be placed before a brisk fire, and the varnish, as it were, dried into the paper. The surface should then be rubbed hard, and for a considerable time, with a piece of linen rag, so that all superfluous varnish may be rubbed off, and the surface left quite dry. The negative will now be found to possess a transparency and sharpness such as it had not before, and in the printing the positives will have an intensity and definition far superior to those taken from the unprepared waxed paper. The time required for printing is also diminished. The negatives may now be preserved just as collodion or albumen glass negatives are, in grooved boxes.

Fothergill's Process Cracks.

To the Editor of the Photographic Journal.

12th November, 1858

SIR,—The most serious objection I have found to the New Collodio-Albumen Process of Mr. Fothergill, is an extreme liability of the film to split and peel off in drying, after development and fixing. I don't know for what reason: perhaps because the protecting coat of albumen may in these cases be more than ordinarily attenuated: this tendency I have especially noticed in the pictures which are otherwise most perfect. I have tried Keene's collodion without effect, and in spite of every precaution in fixing and drying, have lost several of my best negatives at the last moment in this way. The only remedy which has proved at all efficacious in my experience, is *the re-albuminizing the fixed and washed negative before drying;* and by this expedient I have even saved some negatives after the film had begun to rise from the plate. Perhaps some of your readers may be able to suggest some means still more invariably successful for preventing the very annoying source of failure to which I refer.

W. L.

ANSWERS TO CORRESPONDENTS.

By the kindness of Mr. Murray, Albemarle Street, we shall be enabled to present our readers, in an early Number, with two plates taken from photographs in Mr. Ellis's most interesting book on Madagascar, and also to give some further photographic notices for that work.

H. W. B. (Erdington).—All prints should remain in the hypo-bath until they are quite transparent when held up to the light. A picture imperfectly treated has a granular appearance something similar to the section of a nutmeg.

Messrs. Ogle and Edge have favoured us with some beautiful specimens of stereoscopic slides, to which we hope to give an extended notice in a future Number. They are some of the most pleasing specimens which we have seen.

V. (Dundee).—We are obliged to you for your suggestions; but the relatives of English and foreign weights are to be found in all good works on photography. You will consult Mr. Hardwich's Manual upon this point with advantage.

"*Ness*" (*Clonmel*).—It is our own practice to reject prints which are overprinted, and not to attempt those improvements by immersion in an acid gold bath. If cyanide of potassium is used, they seem to fade rapidly after they have been so treated. Of course, unless great care is used, cyanide entirely destroys them.

E. D. F. (Salisbury).—1. It is probable that the gold has been precipitated from your bath: if you use either of the baths recommended in our late Numbers, carefully prepared, perfect success will attend you. 2. The process of Mr. Fox Talbot is certainly the one you should attempt.

C. J. N. (Norwich).—Writes to complain that he cannot obtain success in the enlargement of pictures, as recommended by Mr. Campbell in his paper on the Perspective of Photographs published in this Journal. Our many calls have prevented us from personal experience, but we have seen some fair results. A letter addressed by you to Mr. Campbell, no doubt, would give you the information you require.

An Amateur (Private).—We have received a long communication from this correspondent (who wishes to remain *incog.*), recommending many things for the advancement of the benefits desired from the Photographic Society. The general purport of his letter has been submitted to the Council, and we thank him, in their name, for the suggestions, but assure him several of the prints alluded to have already occupied their attention, and they will be pleased to receive any further suggestions he may think right to favour us with. We hope that the appeal made to our Members for cooperation in the proposed distribution of a good specimen of photographic art will still meet with extended contributions.

T. O.—Your name has been forwarded to us for election into the Society, by Professor Delamotte, but by some accident it was received too late for the meeting of the 4th inst. We shall be pleased to see you at the Exhibition in Suffolk Street, and at the Society's Rooms, in the same manner as if your election had taken place, which shall not be neglected at our next meeting.

In the Exhibition of the Photographic Society are a series of pictures, contributed by C. J. Burnett, Esq., of Edinburgh, Nos. 384 to 392 inclusive; they are of much interest, as illustrating the chemistry of the Photographic Art, and will be described in our next Number, published on the 21st inst.

Communications Received.—The Rev. Mr. Ellis; Mr. Traer; Mr. Cruttenden; Lake Price; C. J. Burnett; Roger Fenton; An Amateur; Professor De la Motte; The Rev. C. P. Cleaver; J. W. G. Gutch; Mr. Fuidge; Sir W. J. Newton; Henry Greenwood.

All Communications for the Journal should be addressed to the Editor, at the Publishers, Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 77. JANUARY 21, 1859.

We have received complaints from various sources, and among them from the authorities of the General Post Office, as to the confusion caused by the recent assumption by Mr. Greenwood's "Liverpool and Manchester Photographic Journal," of the title by which this Journal exclusively has hitherto been familiarly known. Foreseeing the result, we had beforehand deprecated the contemplated adoption by Mr. Greenwood of our title, and we have since endeavoured to induce him to make some modification in the title as at present used by him, but hitherto without success. We can therefore *for the present* only suggest to our correspondents that they invariably add to the superscription of their letters the address of the Editor, and to our friends that in ordering copies of the Journal from any but the Publishers, they should be careful to specify that they require the Society's, and not Mr. Greenwood's Journal.

At the moment of our going to press, our President, the Lord Chief Baron, is doing Photographic honours to the world of art and fashion in Suffolk Street. The Society's rooms are thronged by a brilliant company; our friends and guests appear to enjoy the opportunity of meeting in friendly circles, as well as the splendid and various specimens of Photographic Art displayed on the walls. The Exhibition, we are glad to report, has been more successful up to this date than *any* Exhibition we have yet had the pleasure to hold.

As there must appear an obvious impropriety in the Council of the Photographic Society reviewing their own productions, those of their associates, and also those of their generous emulators and fellow-students far and near—pronouncing opinions which at once become translatable into market values—it is thought wise to discontinue this form of self-examination.

Yet, as our readers will expect to see some adequate record of the Exhibition in our columns, we propose to call to our aid the chief voices of public thought, and listen, under limitations, to what they may praise or blame of our work. This change we believe will conciliate and gratify our Members; they will obtain in exchange for a single, perhaps a rival or hostile criticism on their productions, the mature verdict of important organs; they will obtain this in a convenient shape, without trouble, and in a form convenient for preservation. For a clearer understanding of our plan we refer to the report prepared as an experiment, and we shall be glad to receive suggestions on the result.

THE EXHIBITION IN SUFFOLK STREET.

FIRST IMPRESSIONS.

"Photography is (there can be no denying it) another wing added to the great palace of Art,—perhaps, in comparison with Raphael chapel and Ostade kitchens, a wing of mere workshops and tool-rooms; but still they make the old house larger and more luxurious, they lengthen the vistas and enrich the whole family; so we are glad to see them, and long every year to walk over the "improvements." Except in size, we see no particular advance this year in the new Art; the tent-stakes remain in the same holes, water and cloud with all their fugitive beauties are still as unfixed and chameleon-like as ever, and promise for some time at least to be to the hooded men what quicksilver was to the alchimists, the unchainable and truant spirit that tempted them by apparently listening to their spells and yet refusing to own their power. This year, it is true, the photographs in these rooms, almost entirely English, are sharp as if drawn with

has a special relief,—and if the finger says it is not raised, we are inclined even then to trust our eye and disbelieve our finger. The shingly pyramids, that seem scaling and sloughing with time, are only surpassed by the sanctity of tone and distance about the 'Mount Horeb' (550), every buttress and combing of which must have been associated with long years of Jewish camp-life.—Mr. Maxwell Lyte's 'Pyrenean Views' (629, &c.) should not go unnoticed.—A frame, containing four landscapes by Mr. Rosling, is eminently attractive."—*Athenæum.*

"Mr. Roger Fenton is an important contributor; and has sent, besides numerous landscapes, showing that amount of air and distance, for which his works are remarkable, some illustrations of Eastern costumes and manners. Mr. Frith has some charming specimens; notice particularly 547 and 558. For delicacy and clearness conjoined, Mr. Francis Bedford is unrivalled,—see, for example, his North Transept, Tintern (137), Pembroke Castle (139), and the West Front of Tintern (143)."—*Builder.*

"Foremost among the landscapes of the exhibition stands the magnificent dioramic view of Cairo, upwards of eight feet in length, by Mr. Frith. It was taken from the summit of one of the buildings that command a view of the famous city. The flat-roofed houses, the tall minarets, the narrow streets, the crowded localities, the Nile winding in the distance, and beyond it the dim outline and diminished form of the great pyramids, all contrive to make this one of the most extraordinary and interesting works which have been produced. The dioramic view is surrounded by a number of other views of the locality which have already been made familiar to the public by the charming stereoscopic views published by Messrs. Negretti and Zambra. Next to this in point of size, and remarkable for its boldness, combined with the most remarkable accuracy and clearness of detail, is the great view of the interior of the Crystal Palace, Sydenham, by Mr. Delamotte. The sharpness of outline of the long vaulted roof and its supporting columns, the play of shadow on the water of the basin of the crystal fountain, the foliage of the climbing plants, and the trees and shrubs in the nave, are all given with a success which has rarely or ever been equalled. This work is one of the photographic pictures which it is intended to distribute among the subscribers to the newly-established Crystal Palace Art Union. Some views, by Mr. Cundall, of places of interest in Kent are deserving of great praise for their execution, not less than for the inherent beauties of the pictures themselves. Igtham Moat is exquisitely beautiful, and scarcely less so are some fine views of Charlton, of Rochester Cathedral, and other places. Mr. Alfred Rosling again exhibits some of those delicious little pictures in the choice of which he appears to have almost an instinctive good taste. It is difficult to say whether one admires more the points of view which he selects, or the careful manipulation which is evident in the development of his subjects. A view of Betchworth, a group of chestnut trees, and some other bits of rural scenery, are among the gems of the present exhibition. Mr. Bedford, a not less careful manipulator, revels in the ruins of Tintern Abbey, of old Eltham Palace, of Raglan, Haddenhall, and other places of interest and picturesque beauty. They are charming specimens, and the army of photographers who traverse the land every year to discover new beauties for the million, deserve the warmest thanks for their exertions."—*Morning Chronicle.*

"The present exhibition is not, however, rich in what we may call 'high art' efforts. Mr. Rejlander's contributions (Nos. 2, 20) display taste in posing the figure. 'Well!' (154), an old pedagogue listening impatiently to the imperfectly-learned lesson of two blue-coat boys, is also full of humour; and 'The Scripture Reader' (183) has all the elements of a picture; but Mr. Rejlander exhibits nothing nearly so ambitious as his elaborate 'Two Ways of Life,' of last year. The mother is too short and the child too old in the otherwise meritorious 'Little Red Riding Hood' (13, 18) of Messrs. Truefitt, brothers. 'The Queen of May' (23) is a small and picturesque composition by the same gentlemen. 'Fading away' (18), by Mr. Robinson—a consumptive girl surrounded by mournfully solicitous friends—is, considering the inherent difficulties of the subject, a successful effort, although the grief of the sister is evidently simulated, and the taste of the whole questionable. Mr. Roger Fenton has been trying his hand upon some Oriental figure subjects: of these, one or two are as important and felicitous as any of the landscape subjects with which Mr. Fenton appears in such force. In 'The Reverie' (50), for example, we have more than all the detail of a water-colour drawing by John Lewis, and at the same time a low tone of singular breadth and sweetness. All artists, and most photographers, will agree with us that there is nothing better in arrangement or conception in the whole exhibition than the small and exquisite photographs 'Preparing for Market' and 'The Dead Bird' (73). The photographers, Messrs. Delferier and Beer, were also extremely fortunate in their intelligent and pretty subjects. The old smuggler with his 'Forty Winks' and 'One Wink' (83), by the same gentlemen, is almost equally excellent. The better choice of points of view, and the preference shown for picturesque ruins, prove that landscape photographers are making progress in their artistic education. The colour green still however presents the great difficulty, especially in the treatment of foreground foliage. It always tends to black from the photographic power of the component yellow ray, and this contrasts with the inevitable exaggeration of the minute lights on the leaves and the hard outlines of the foliage against the sky, the delicate gradations of which cannot be realized without sacrificing the foreground. We have already alluded to the admirable works by Mr. Fenton. We marked for especial commendation a large series of lovely views of Tintern Abbey, the rugged cleavage of 'Cheddar Cliffs' (55), and 'Chatsworth Castle in the Water' (69), a photograph as mellow as a Cuyp. Mr. Bedford's landscape contributions are almost as numerous as those by Mr. Fenton, and include besides views in and near Gotha, 'The Lakes,' 'Raglan Castle,' 'Tintern,' and many other of our own favourite scenes. These, however, together with

the Egyptian and Syrian subjects by Mr. Frith, and the delicate bistre-toned views in Rouen, by the late lamented Mr. Howlett, are already too well known to require further comment."—*Daily News.*

"The figure-pieces in the exhibition do not, we confess, impress us very favourably. Mr. Rejlander has some, very clever in their bold coarse way, and very valuable as studies. But photographers mistake, as it seems to us, the capabilities of their art, when they attempt to produce photographic compositions in rivalry with works of the pencil. A picture, as distinguished from a view, or a representation of 'still life,' is valuable only in proportion as it bears the impress of the human intellect. It is not because he has faithfully copied a woman and child in a certain position that we admire a Madonna by Raffaelle, but because we see in its depth and purity of feeling a noble realization of an original and poetic idea. A photograph of the models he used in the positions he placed them, and surrounded by all the accessories he introduced, would no doubt form a valuable study for a painter, but it would be a sorry substitute for his picture. What gives his picture all its value is that which he added to its models, and not what he found in them. When, therefore, a photographer, having placed certain persons in an attitude, and surrounded them with various 'properties,' takes a photograph of the group, and presents it with all the stiffness of arrangement, vulgarity of feature, and blankness of expression—or worse, a coarse and exaggerated attempt at the particular expression intended to be conveyed—and asks your admiration for it under some poetic or suggestive title, the most unobservant is struck with the incongruity, and the instructed eye turns from it with disgust. Not the worst—perhaps the best—of such subjects here is Mr. Robinson's 'Fading Away,' which has for months past been in every photographic printseller's window; but look steadily at it for a minute, and all reality will 'fade away' as the make-up forces itself more and more on the attention. And you have only to go a few steps and you see the same face, the same form, and the same character doing duty as 'Mariana,' as it has done—the lens having no power to modify or select—for no doubt divers still more dissimilar persons and sentiments. How awkwardly this repetition of face and form comes in is even more palpable in the photographs, undoubtedly clever, as in many respects they are, of Messrs. Delferier and Beer, where a certain broad-faced female, evidently belonging to a great city, in some pictures is an innocent northern peasant preparing for market, in another a sentimental inmate of an Eastern harem. It will not, we trust, be supposed that we are insensible to the value of photography in those branches of art in which the human form is the chief object. Photography is in truth, or may be made, an invaluable assistant to the painter of history or *genre*; but photographic renderings of historical, poetic, or domestic subjects are, we are convinced, a mistake—only serving to mislead and corrupt the unformed taste.

"Of our home-landscape photographers, Mr. Fenton still maintains the lead. He has many works here, some perhaps new, but as we are not sure of the fact, as the major part are certainly familiar, we shall not attempt to particularize them. They are all, or nearly all, admirably selected as to point of view, and are enough to make the topographic landscape draughtsman tremble for his craft. They are also, we need hardly say, excellent as examples of photographic manipulation. But Mr. Fenton wants either some change of subject or of style. There is coming over his works some feeling of mannerism or monotony. It is needless to say that this does not apply to his noble photographs of ancient sculpture, or his studies of female form and costume, though these last are not among the happiest of his works.

"Treading closely on Mr. Fenton's heels—if he would take a bolder stride we are not sure that he would not outstep him—is Mr. Francis Bedford, who has here the works we noticed in the Architectural Gallery, and others at least equal to them, all surprisingly brilliant in tone and sharp in detail, whether that detail be crumbling stone, or moss-covered rock, or quivering foliage—but here again we want to see some new thing. We are glad to see these here, however, for the exhibition is decidedly weak in architecture. It sadly wants supplementing with some works on a grand scale, like the Venetian buildings in the Architectural Gallery. Inferior to Mr. Bedford's, but still very pleasing, are some of the views of Canterbury Cathedral by Mr. Turner. Very graceful also are the landscapes taken along the Surrey Mole by Alfred Rosling. But perhaps the most picture-like little photographs of brook and river scenery are those of Mr. Morgan of Bristol, which alike in (what if seen in a painting would be called) composition and in execution, leave nothing to desire—though we long for some leaves on the naked trees, and a little more sunshine glancing along the water. Quite perfect in its way is his 'Study of Fir Trees' (No. 74), and we commend it to the careful study of our younger landscape painters."—*Literary Gazette.*

"Such pictures as Mr. Fenton's Oriental studies are not open to objection. They are valuable and most artistic illustrations of costume and character."—*Times.*

ARCHITECTURE.

"In Architecture Mr. Fenton ranks quite first as a 'New Master,' sometimes broad and crumbly as Prout's ripe Stilton, old and mildewy; sometimes fine and graduated as Turner. One of his finest works here is the nave of 'Salisbury Cathedral' (582), with the sunshine in arches on the wall, and in sister arches of light on the pavement. At the far end twinkles the painted window with its amaranthine bloom of saints turned to flowers, or rather of victorious saints heaped by the angels with the blossoms of heaven. His 'Wolsey's Gate, Ipswich' (622), is rich in tone and impasto; the bricks seem really thick and crusted. For massive breadth Mr. Cruttenden's 'Norman Staircase, Canterbury' (112) is especially good, and a fine example of our early style it is.

"Mr. Bedford's 'Views of Tintern' (118) are choice, but scarcely equal to his 'Raglan Castle' (99), which has darkness the eye can traverse, and bushes of ivy wrought in in a way that would drive weak men to split their palettes and light

their fire with them. . . . Mr. R. Howlett's 'Views at Rouen' (158) are like so much carved ivory, sharp and delicately wrought as Orcagna's tabernacle work. For fretted Gothic, scaled and frosted by time, Mr. B. B. Turner's 'Gates and Chapels at Canterbury' (207, &c.) much demand notice."—*Athenæum.*

"An extraordinary feat in the photographic art is No. 169, 'The Crystal Palace,' Sydenham, by P. H. Delamotte. It is the largest work of the kind ever exhibited in public—at least in this country; but though it is in three pieces, there is scarcely any trace of perspective distortion or focal difference, and all the thousand objects of art, the varied forms of vegetation, and the structural details of the length and breadth of the Crystal Palace are given with the utmost delicacy, and without the least 'muzziness.' The 'Panorama of Cairo' by Mr. Frith, of which there is an 'impression' here, is longer, but the defects incidental to these performances are more apparent in that than in the work of Mr. Delamotte. Above this is a specimen equally successful, although not so large, but equally admirable for the perspective, both linear and aërial. It is by Macpherson, from the 'Forum at Rome.'"—*Observer.*

"Mr. Delamotte's 'Crystal Palace' (169) is successful, but necessarily broken and entangled."—*Athenæum.*

"The view of the Crystal Palace by Mr. Delamotte is one of the largest and best views of it that we have seen."—*Morning Advertiser.*

"Mr. Hamilton Crake contributes some valuable additions to our knowledge of Indian remains; such, for example, as the views of the Parthardiah Pagoda, Madras (156), the Seven Pagodas in the same presidency (165), and others."—*Builder.*

PORTRAITS.

"In portraiture the exhibition is as rich as might be expected. Pre-eminent for taste and delicacy in this application of the art are the miniatures of Mr. T. R. Williams, over whose frame is placed, not undeservedly, a photograph from Rauch's marble 'Victory,' wreath in hand. The miniatures of Messrs. Lock and Whitfield also well merit a high place among the praises of their many competitors; and the veteran Claudet stills holds his ground, though the large portraits he exhibits have too much of the painter's work upon them to give the sun quite fair play.

"Dr. Diamond applies the art to the forwarding of medical science, in his photographs from the insane, which illustrate, in a useful and novel manner, the physiognomical characteristics of mania."

"In portraiture, by borrowing the artistic principle of centralizing the interest, Mr. Williams and Mr. Hering still obtain the same pleasing effects in their vignettes. 'Recollections of "Our Club"' (348), by Dr. Diamond, will interest the large circle of friends of the *habitués*, one of whom, poor Jerrold, is, alas! no more. A gentleman of Odessa, by name Chloponino, sends some noteworthy portraits. One room is devoted almost entirely to coloured photographic portraits, of which those exhibited by Mr. Claudet, and Messrs. Lock and Whitfield, are of conspicuous merit; but a vignette, coloured by Mr. Hering, is decidedly the most legitimate and artistic effort."—*Daily News.*

"We must draw attention to the admirable frame of portraits by Dr. Diamond, entitled 'Recollections of "Our Club"' (348). The well-known faces are caught in their best moments and in their pleasantest and cleverest angles. Every-one seems saying his wittiest say, and thinking his acutest thought."—*Athenæum.*

"There is a large collection of portraits, plain and coloured. Messrs. Claudet, Mayall, Williams, Cundall, Lock, and Whitfield exhibit many specimens, some with all the finish of the most exquisite miniatures, but which do not come strictly within the pale of photographic works. The slightly-tinted vignette portraits of Mr. Cundall and those of Mr. Williams are light and pleasing in their style, and compared with the ghastly portraits of the early photographers, they will afford perhaps the readiest means of estimating the vast progress which has been made in the art during the last few years."—*Times.*

"From figure pieces we naturally proceed to portraiture; and though we have objected to the number (twenty-four), we are bound to express our admiration of the beauty of many here exhibited. By Messrs. Maull and Polyblank, Herbert Watkins, and some others, whose portraits of distinguished persons have at these exhibitions often attracted so much attention, and won so much praise, we have no specimens here. The leader on the present occasion is, as we have already hinted, Mr. Williams; and extremely fine in all respects are his *untouched* vignettes. Those of Messrs. Lock and Whitfield are also very excellent. Some heads by Mr. Clarkington are likewise of a superior order, especially that of Mr. Hunt; but, like Mr. Claudet's, they have plainly been much worked upon. Dr. Diamond has a frame of portraits, entitled 'Recollections of Our Club,' of much more interest than the majority here, inasmuch as it contains the portraits of many notabilities in the various walks of intellectual life. Dr. Diamond has also some of his painfully vivid 'Illustrations of Mental Disease.' Noteworthy, as curious illustrations of national character, are likewise the Russian photographs of M. Chloponin: what a singular expression, for example—is it sinister, cunning, or keen?—is that of 'Parogoff, the celebrated Russian Surgeon'! and what a magnificent head is that of the 'Russian Carpenter'! Had the latter been marked Parogoff, what noble traits would have been discovered in it by the disciples of Lavater or Spurzheim!"—*Literary Gazette.*

"Dr. Diamond, to whom photography owes much, exhibits amongst other things an excellent set of interesting portraits of 'Our Club.'"—*Builder.*

"Mr. C. Clarkington's portraits are graceful; but, whether owing to the fault of his sitters, or his own bad taste, are coloured, and a coloured photograph is no better than a coloured print.

"Mr. T. R. Williams has adopted light backgrounds to his portraits, which give a very graceful effect to the subjects. One of the most interesting works is 'Our Club,' by Dr. Diamond, which is not only so as a photograph, but from containing

twenty-seven portraits of notorieties of the time. Mayall's portraits are good, but much touched; although he does not, like some other exhibitors, declare them to be pure when they have been worked upon, which we observed to be the case with several, although they are varnished to conceal the fact."—*Morning Advertiser.*

STEREOSCOPIC.

"The least satisfactory branch of the Exhibition is the stereoscopic. In this there is a constant temptation to vulgarity in the choice of subjects, and exaggeration in the rendering of solidity. The subjects of the stereoscopic slides which fill our shop-windows, where they are not landscapes or portraiture, are often gross, and almost invariably 'snobbish' to a painful degree. There is a great danger that photography, by the dissemination of this class of works, will be fostering a worse taste than the worst school of painting ever did or can spread."—*Times.*

"One of the most curious series is that of 90 stereographic views in Brittany, illustrative of a walking tour made by Mr. Jephson. This work may be said to commence a new era in publishing, as the photographs are to be sold with the volume of the travels. Many of the stereoscopic views and portraits are poor and common."—*Morning Advertiser.*

"Among the stereographs there is one series which demands a word of special notice, inasmuch as the pictures are not only new (the only series here that is so), but illustrative of a work somewhat novel in character. The series is called 'Stereographic Views in Brittany, illustrative of the Narrative of a walking tour made in the Autumn of 1858, by J. M. Jephson, M.A.' The stereographs, no fewer than 90 in number, are by Messrs. Lovell Reeve and H. Taylor, and include churches, castles, crosses, dwellings, lonely ruins, and Druidic remains, as well as the crowded streets and market-places, and quaintly-dressed peasants, of that pleasant and picturesque country. Of the other stereographs, the best are those of Welsh scenery and the interiors of Salisbury and Winchester cathedrals by Mr. Sedgefield. They are very admirably executed; but they have been long before the public, and their excellence has been fully appreciated. One other set we notice for the sake of entering a protest against their presence here. Stereographs of 'fast' young men looking from a hiding-place in the cliffs at girls undressing to bathe in the sea, or 'ladies' in full dress leaning over a balcony, the offensive points exaggerated to suit prurient tastes by a well-known stereoscopic trick, are not what ought to be found in a place like this, and these have neither novelty nor superior executive skill to atone for their intense vulgarity of sentiment. The Council would do well to ask themselves whether it be even now too late to remove what has called forth a general expression of surprise."—*Literary Gazette.*

"Mr. W. H. Bosley's frame (522) lends a countenance to the abuse of the art to be seen in some of the shop-windows, which it ought not to find on these walls."—*Builder.*

MISCELLANEOUS.

"Mr. Bingham is doing for the pictures of Delaroche something like what Messrs. Caldesi, Montecchi, and Thompson have done for the cartoons of Raphael. We say 'something like,' for many of Mr. Bingham's photographs are from engravings or drawings after the French master, and not from the pictures themselves.

"Mr. Howlett, however, in his direct photographs from the pictures of Cooke, Philip, and other English painters here exhibited, shows how much may be done by skilful management from the artist's own handiwork.

"The sculptor should be even more largely indebted to photography than the painter. What engraver could represent a bust as Mr. Jeffrey has represented Mr. Woolmer's admirable bust of Tennyson (167), or as Mr. Fenton has rendered the noble antique heads of Ajax (58), or the Philosopher (42), from the British Museum? English and foreign landscape and home and continental architecture have been treated with conspicuous skill, not only by Fenton—the completest master, perhaps, of his craft (everything considered) who exhibits here—but by M. Bisson, Mr. Maxwell Lyte, Mr. Francis Bedford, Mr. Morgan, Mr. J. W. Ramsden, and Mr. R. Howlett, among others too numerous to mention. The Rouen subjects by the latter are hardly to be surpassed in sharpness and delicacy of light and shade.

"Nor does science fail to call in the aid of the photographer. Here, for instance, are geological photographs by Mr. Gutch, in which the structure of limestone-shale, granite, greenstone, and hornblende is made as palpable to the eye as it could be by the specimens in Jermyn-street, and in which, moreover, the larger geological characters of these rocks are represented in a manner which is unattainable in the fragments of the museum-case. So the marvels revealed by the microscope are reproduced, in magnified proportions, by Mr. R. Howlett. In these we can study the wonderful mechanism of the fly's hair-brushes, or the delicate cell-tissue of the grasses, without effort, and at our leisure.

"Mr. C. T. Burnet applies the photograph to agricultural machinery; Messrs. Ross and Thompson to the exquisite details of our ferns and mosses. The very waves are caught as they curl their heads, by Cundall, Downes, and others: and the Palmira jungle and cocoanut palm grove lift their dry spikes of foliage and their columnar stems into the clear Indian sky, from the negatives of Mr. Hamilton Crake.

"Constructive skill, fine art, and botanical science are illustrated at the same time in Delamotte's remarkable plate of the interior of the Crystal Palace, than which the Exhibition contains no greater triumph of skill over photographic difficulties."—*Times.*

"In addition to the application of photography to the purpose of making copies of the old masters, there are some specimens which show how the works of modern painters may be successfully reproduced by its aid. A series of copies of the paintings of Paul Delaroche are exhibited, some of them exceedingly beautiful—among others, that of Ophelia borne along by the stream."—*Times.*

"In illustration of new processes and new applications of the art, the Exhibition is rather disappointing. Of Mr. Pouncy's much-talked-of carbon process, and of which the Society is regarded as to a certain extent the exponent, there is only a single example by the inventor, and only one other by a disciple. Whilst we cannot regard it as having succeeded so perfectly as Mr. Pouncy in his zeal very naturally imagines, we are by no means disposed to join in the attempts made to depreciate it in the public estimation. To us Mr. Pouncy's print appears very promising, and if to chemists it really seems permanent, we cannot think either professors or amateurs will do well to neglect it. The present example is wanting in clearness and sharpness of detail, and also in purity of tone: it has what painters and lithographers call 'a mealy look'—something resembling in appearance a drawing made by a stump and brush with powdered black-lead. Of the carbon-printing processes, either English or foreign, there is not a single example; nor is there one of the application of photography to astronomy; nor of Mr. Talbot's photographic engraving; nor of any of the new and loudly-vaunted photo-lithographic processes. Mr. Pretsch has, however, sent several examples of his photo-galvanographic (or, as he now seems disposed to call it, 'Nature's engraving') process; and as they are 'quite untouched,' they give a much more true, and a much more satisfactory, idea of the process than the published prints. For some classes of subjects it seems so clearly suited, that we trust it will not be suffered to fall into abeyance."—*Literary Gazette.*

"Looking now more to the general question, we may note that, as regards the application of photography to wood for the purpose of engraving, there is still much difference of opinion. When looking at some of the best efforts of the art, a person of artistic taste, but who was not acquainted with the conventionalities of engraving on wood, would think that these sun-pictures of bold objects would be the very things to suit the engraver. Engravers, however, have a strong opinion that photography cannot in this way be rendered available to any great extent. They say that the immense amount of detail in a photograph would cause an amount of labour which would greatly overbalance the cost of a drawing on wood by a practised artist, which would be adapted to the engravers: besides, there are certain arrangements of light and shadow which they say are necessary for the purposes of printing. They refer, for instance, to the works of Gilbert, Thomas, Foster, and others (which, when engraved and printed, are remarkable for the force and brilliancy of their effects), and contrast them with the engravings from photographic pictures which have been executed on prepared blocks, or from a careful *fac-simile* drawn by the draughtsman on wood. It is argued that the appearance of any architectural object or landscape can, if faithfully sketched, and then transferred to the wood in the ordinary way, be conveyed to the great bulk of observers in a more striking manner than by means of photography.

"Whilst submitting to some extent to the opinions of many who have for years practised the art of engraving on wood, we cannot but notice the wonderful progress which photography has made during the last few years. Our belief is, that for many purposes photographs on wood will supersede the hand-drawings at present in use, especially for engravings of art-manufactures, objects of natural history, illustrations of anatomy and scientific subjects, &c., in all of which the greatest neatness and attention to detail ought to be a chief recommendation. The value of photography in this department is evident; and no doubt some engravers will break through the present conventionalities, and adapt these sun-pictures on the wood both to the engraver and printer."—*Builder.*

"In still-life, for Ostade goldenness and soft breadth, we must praise Mr. Sherlock (378), who has a manner—though he does think through a machine—as strong and peculiar as if his name were Mieris or Gerard Dow. His spades have a reflective dignity quite Æsopian; his hares dangle from the wall with a poetry in their dependence; his potatoes are epical; and his cabbages have a greater charm in their crinkles and curlings than duller men's flowers. Photography will, we hope, in time entirely destroy all necessity of men wasting their time in painting still-life. Only Dutchmen will think it well now to spend their lives on glittering stewpans."—*Athenæum.*

"There are several fine specimens of photogalvanography, the invention of Pretsch, which will give great satisfaction to the intelligent visitor, and examples of instantaneous productions in the Exhibition; among them are the 'Waves,' and some other subjects by Cundall and Downe; 'Study of Clouds,' Ernest Edwards."—*Observer.*

CONCLUSION.

"Altogether the chief impression left on the mind by this exhibition is one of delight, with the work already accomplished, blended with a puzzled self-questioning as to the limits of the application of an art for which every day opens new fields, and as to the bearings of photography upon the work of the painter, which it must either influence for good, or, in the long run, so far supersede altogether, at least in its unidealized manifestations."—*Times.*

"With all its shortcomings and redundancies, the Photographic Society may well be proud of its sixth exhibition. If it does not show the entire strength of the art, it very fairly illustrates the point to which the art has reached in this country; and it shows with sufficient clearness the wonderful advance which photography has made during the few years of its existence, and the almost unbounded range of its capabilities." —*Literary Gazette.*

"As a whole, therefore, it will be seen that this exhibition is not only excellent in itself, but that it indicates a decided movement or advance in photography; and though it is a matter of disappointment that some of the more recent triumphs of the art are not illustrated in the present collection, still it must be conceded that it is an exhibition highly honourable to the national taste and activity."—*Observer.*

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

The same proviso extends to communications to the Editor.

*** At the time of our going to press we have received the fifth edition of Mr. Hardwich's 'Photographic Chemistry,' a review of which we promise our Readers in the next Number of this Journal.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

Ordinary Meeting.

January 11th, 1859.

T. B. Johnston, Esq., in the Chair.

The minutes of the preceding meeting were read and approved. The following gentlemen were balloted for, and elected ordinary members:—The Right Hon. Sir George Clark, Bart.; Kenneth Macleay, Esq., R.S.A.; John M. Hunter, Esq.; J. Dick Peddie, Esq.; H. G. Dickson, jun., Esq.; Richard Rimmer, Esq.

The following donations to the Society were intimated; three specimens of Carbon prints (one of which is now in the Society's Exhibition), from Mr. Pouncy; the "Photographic Almanac, for 1859," from Mr. Wm. Lay. The thanks of the Society were given to the donors.

Mr. J. T. Taylor read a paper on

Discoveries and Rediscoveries in Photography; with an account of the Alabastrine Process.

In the few remarks I have now the honour of submitting—with much deference—to your notice, the style must necessarily be of a somewhat loose and disjointed kind; indeed the more it is characterized by this feature the better augury for my success in my intention of bringing before you an account of the principal discoveries, rediscoveries, and would-be discoveries in photography.

The subject is replete with fertility; for at no time prior in the history of the art have these been growing "so fast and furious" as at the present time, when the newspaper press, the provincial press especially, ever and anon teems with the most startling discoveries, which, after perusal by the veteran photographer, are declared by him to be only another confirmation of the accuracy and shrewdness of Solomon's idea, when he descants on the entire absence of novelty in anything under the sun.

In the history of the art, three, and in my opinion three only, are entitled to the chief place in the ranks of our early photographic fathers. Photography has attained its present high *status* as the direct result of their discoveries,—discoveries flowing from that patient and persevering investigation, and those close reasonings and deductions which distinguish the true discoverer from the one who, haphazard, *stumbles* on a discovery, perhaps of deep importance. Others may have different views on this subject; but it is my opinion that the principal niches in the temple of photographic discovery belong to Nicéphore Nièpce, Daguerre, and Fox Talbot. All dve honour, however, be to those early pioneers who, by their philosophic research, paved the way to, and doubtless facilitated, the subsequent discoveries of these three and others. While I cannot recognize in the experimerts of Wedgewood and Sir Humphry Davy any peculiar grounds for the great merit usually attachable to them, quite different is it in the case of Scheele, who, in his experiments, subjecting the silver salts to the action of the prismatic spectrum, first struck out a path different from that hitherto trodden by the old alchemists, who seemed to rest satisfied with the fact that certain salts become rapidly nigrescent on exposure to light. Although the discovery is attributed to Ritter, it seems scarcely probable that such a close observer as Scheele could have failed to notice the now well-known actinic action of the dark rays beyond the violet in the spectrum. If he did observe this peculiar property, he makes no mention of it in his researches, which were published in 1777. Ritter made this very interesting discovery in the beginning of this century.

The first to enter the field of active photographic discovery was Nicéphore Nièpce, the main feature of whose discovery is, that certain gums—bitumen for instance—are so changed in their constitution by an exposure to light, as to become quite insoluble in certain menstrua, in which, prior to such exposure, they were perfectly soluble. N. Nièpce was the first who produced permanent pictures by the sun's rays. He is the father of all who employ bitumen, or analogous substances, in the various processes of photo-lithography, photographic engraving, or direct positives on white metal plates. His process is represented in our Society's album by the large and beautiful photolithograph by Mr. M'Pherson of Rome.

Daguerre's process quite took the scientific world by surprise. The extreme minuteness, fidelity and beauty of his pictures, excited the most unbounded admiration. Nor is this to be wondered at; for even at the present day, when the eye is accustomed to all that is beautiful

in the art, a well-executed daguerreotype never fails to evoke sentiments of the most pleasing kind. Pity it is that the process of Daguerre meets with so few adherents now-a-days! Perhaps to the labour involved in polishing the plates may be attributed one chief cause of its declining popularity. Veteran photographers still look back to this, their first love, with feelings of deep fondness. If I mistake not, the gentleman who presided at the last meeting of this Society must be one of this class, for at the close of the meeting, in a desultory conversation, he asked me by what door I entered photography; and on my replying that I had been an amateur daguerreotypist in 1845, he replied, "Then, Sir, you must be one of the right sort, for I hold no man a thorough scientific photographer who has not mastered the details of this process."

Of the important services rendered to photographic art by the remaining one of those I have designated as the early fathers of photography, Mr. Talbot, you are all aware. To him photography owes, in minutest detail in some, and in general principle in others, the Calotype or Talbotype process; the waxed-paper process; the albumen process; the collodion process; the general process of printing a positive from a negative; the process of printing positives by the negative or development process; and lastly, the art of photoglyphic engraving.

The ball of photographic discovery having been started by these, has been kept rolling till the present time by a number of gentlemen, who, by subdiscoveries of the most important kind, have laid photographers under a deep debt of gratitude, and have won for themselves names quite imperishable in the annals of photography.

These I will detail in alphabetic order; and as it is impossible but that many, whose names may spring up before some of you in grateful remembrance may be omitted, I have only to state that such omission is altogether unintentional on my part. To Archer, then, we are indebted for the well-known collodion process, a successful method of removing the film from the glass plate, and a process for producing very white glass positives, now known as the alabastrine process: to Becquerel, for his scientific investigations in polychrome photographs, and in the exciting and continuating action of certain rays of light: to Beauregard, for the process now called the ink-process of printing positive photographs, and for the successful production of polychrome prints. Sir David Brewster introduces the refracting stereoscope, and Berry, japanned leather as a substance on which to take collodion positives in lieu of glass. To the name of Burnett is attached a profusion of new processes, and a variety of interesting and valuable researches in the photographic properties of the various salts of iron, copper, chromium, uranium, and other metals; for a leather varnish on the surface of paper by the action of tannin on gelatine; for toning by neutral and alkaline chloride of gold baths, rendering over-printing unnecessary; for successful application of ammonia as a substitute for hyposulphite of soda in paper processes; for the suggestion of *burning-in* uranium and other photographs in presence of an atmosphere of hydrogen or other reducing agent, for the purpose of obtaining dark colours; and for a method, now claimed by the French *as new*, for preparing paper with a solution of gutta percha as a basis for collodion and other films. To Church we owe the pneumatic plate-holder; and to Claudet, the discovery and application to daguerreotyping of chloride of iodine, an instantaneous process of printing positives, in which bichloride of mercury is employed, and the invention of the whole-lens stereoscope. Crookes contributes varied scientific investigations of a highly interesting character in polarized light and the solar spectrum, and, with Spiller, was the first to preserve the sensitiveness of collodion plates. Edwards, in 1841, transferred the image of the daguerreotype from the plate to paper. Dr. Fyfe, taking advantage of the bleaching action of the hydriodic salts, first took positive pictures on paper by *one* operation. Fizeau deservedly gets credit for applying the hyposulphite of gold as a fixing agent for daguerreotypes; Fothergill, for a dry collodion process, in which the albuminate of silver is employed; and Gaines, for the so-called parchment paper. Positive operators on glass must thank Gaudin for the substitution of cyanide of potassium for hyposulphite of soda: this gentleman also was the first to transfer collodion prints to a white ground; as was Goddard to introduce bromine in daguerreotyping operations. The names of Herschel and Hunt now take rank; but their researches and discoveries are so numerous and important, that they cannot here be enumerated, and would require to form the subject of a separate paper.

Johnson was the first to impress photography into the service of wood-engraving. Laborde claims the addition of certain salts of lead to allow of collodion pictures being developed by gallic acid; Lafon de Camersac, the application of photography to ceramic ware; and Le Gray, the wax-paper process.

To Lyte we are indebted for an instantaneous collodion process, with lengthened time of keeping before exposure, and also for metagelatine as a preservative agent; to Llewelyn,

for the oxymel process—a slight modification of Shadbolt's honey process; and to Malone, for philosophic researches in photography. Moser's name is associated with the introduction of thermography, although I believe it owes its discovery to one of my own profession —a watchmaker in France. Nièpce de St. Victor has perfected the process of his uncle, Nicéphore, and has made many researches in photography, especially the higher branches of it. We owe to him the albumen process on glass, and the knowledge of some wonderful properties of iodine. I believe he has also succeeded in producing polychrome pictures. Noton has invented a most beautiful adjustable stop for the front of a lens; Norris has given us a deservedly popular dry collodion process; and Petzval is the author of the double portrait combination of lenses now in general use, as also the orthoscopic lens for landscapes. When Ponton discovered the photogenic properties of bichromate of potass, he had no idea of the important part it was afterwards to play in so many processes, such as Pouncy's carbon-printing process, Pretsch's photo-galvanography, or Poitevin's highly successful system of photo-lithography. Salmon and Garnier are the inventors of an original method of producing engravings, by an application of their discovery that mercury has an affinity for those parts of an iodized brass plate which have not been exposed to light. Shadbolt is the father of micro-photography, and of such as use saccharine preparations for preserving the sensitiveness of collodionized plates. Stokes is associated with the discovery of fluorescence, or the rendering visible those rays of high refrangibility beyond the violet end of the spectrum. Sutton gives us a highly satisfactory and popular mode of printing positives by development; and Taupenot gives us the collodio-albumen process. Wheatstone is acknowledged the inventor of the stereoscope; and Dr. Woods the discoverer of the catalysotype and other beautiful processes but little known to photographers at present.

Such, compressed in the smallest possible bulk, are some of the discoverers and discoveries in photography. But who shall tell of the legions of rediscoverers and modifiers of these processes which have entered the field? For this Titanic task both tongue and pen are incompetent. But as, according to promise at the outset, I find I must say something on these topics, I will select one or two of the most palpable. Soon after Talbot published his Calotype process, the modifiers flocked into the field. *A* said, you will never succeed by following Talbot's directions, for he recommends you to apply the solutions to the paper by brushing, whereas *my* process differs from his in this important particular, that I *float* my papers; and henceforward the friends of *A* say that *his* process possesses some important advantages over Mr. Talbot's; and the newspapers all quote it, and *A* is rendered immortal.

But for Mr. Shadbolt seems to have been reserved the distinction of being made the special victim of modifications—"gross, open, palpable." He discovers a very simple and useful method of preserving the sensitiveness of collodion plates, by pouring over the surface a mixture of honey and water: what more simple? This is called the "Honey Process," or "Shadbolt's Process." Many weeks do not elapse ere we have quite a rush into the field of claimants for similar immortality. One says, I have discovered that sugar and water answers as well as honey, and he is the discoverer of the "Sugar-and-water Process." Another discovers, in a similar manner, the "Sweet Wort Process;" a third the "Glycerine Process," and so on with the "Oxymel Process," the "Raspberry-vinegar Process," the "Sour Ale Process," and other "processes" *ad nauseam*, until matters fairly come to a climax in a side-splitting communication from Manchester, in which is detailed, with mock gravity, but pungent satire, "The Great Gin-and-water Process."

Let us now, in passing, look at a process of ink-printing which was published to the readers of 'Photographic Notes,' with something akin to a flourish of trumpets, by the talented editor of that journal. It is entitled "A New Printing Process, communicated June 7th, 1857, by M. Sella." It consists in treating one of Ponton's chromotypes, first with a ferric salt and then with gallic acid. Scarcely had this appeared when Mr. Sharp, of London, claimed the discovery for Mr. Perry, denouncing the other as a pirate, &c., in these words:—"The whole process, from beginning to end, is the discovery of my friend, Mr. John Perry, 3 Coventry Street, and was patented by him nearly twelve months ago. The details of the operation furnished by M. Sella are almost the *identical words* employed by the patentee in his specification. To learn that M. Sella should call this *his* discovery, is truly absurd, and excites in me, and in the bosom of my friend, the most unqualified aud indignant surprise. In *some* instances it happens that, independent of each other, two men are occupied with the same idea; but in *this instance* it seems scarcely possible." And Mr. Perry himself writes thus:—"Of M. Sella I know nothing, save that he now appears to be pirating a discovery which I claim to be my own; in short, the date of the patent proves my case." The patent being

dated Aug. 1856, of course establishes the prior claims of Mr. Perry. But, alas for the "unqualified and indignant surprise" excited in the bosoms of Mr. Sharp and his friend! the so-called NEW PROCESS in dispute was published, in almost the same language as the patent specification, so long ago as June 15th, 1855. And those of you having Vol. II. of the Journal of the Photographic Society, will find it *in extenso* as a communication from Testud de Beauregard, at page 195.

Notwithstanding the thorough ventilation this process was subjected to, both in its history and the thousand-and-one modifications that were made of it, will it be credited when I say that a member of this Society, who I hope is now present to speak for himself, has recently made this well-known Perry-Beauregard-Sella process the subject of a *re*discovery of his own, and that the process is now walking at large with the additional alias of *Mr. M'Craw's process*. A young imp of an apprentice suggests that, when he begins to try *his* hand at re-inventing, he won't have anything to do with such worthless processes as the one now mentioned, but will attack some one likely to be of more general utility—for instance, the application of chloride of gold for toning silver positive prints, or the salts of iron for developing positive collodion pictures.

I thought I had done with Mr. Burnett, but find it necessary to introduce his name again. I stated that he impressed the salts of uranium into the service of photography. It appears that Nièpce de St. Victor now comes forward with it as a (re)discovery. Not only does he come too late, but the details of his process are very much inferior to Mr. Burnett's; for Nièpce recommends an acid silver-bath for developing, thereby lengthening the time, while Burnett recommends a neutral or alkaline one, which works very much faster; Nièpce recommends an *acid* gold-bath for toning, while Burnet recommends a *neutral* one, which does not eat out the picture in the same way as an acid one does. Nièpce recommends plain water for fixing, which seems an absurdity; Burnet recommends weak solution of ammonia.

Numerous other rediscoveries might be adduced; but these in the meantime will suffice.

Mr. TAYLOR concluded his paper with some practical remarks on the "Alabastrine process," which are reserved for the next number of the *Journal*.

Mr. TUNNY said that he always had, and ever would lift up, his voice against awarding the entire credit of the discovery of Collodion as a Photographic agent, to Mr. Scott Archer. Le Gray was, he maintained, the FIRST to suggest this medium; and although he believed Archer to be an independent discoverer, yet to Le Gray he (Mr. Tunny) considered himself indebted for the collodion process, as now so long practised by him. Mr. Tunny then appealed to the various dates of publication by Le Gray and Archer, to establish his position in making this assertion, which he considered to be due to Le Gray as a simple act of justice. Le Gray, he said, announced his discovery in a work published in February 1850, whilst Archer's process was not made public till March 1851. No doubt Le Gray, in 1850, did not give the details of his process so minutely as did Archer in 1851; but no one acquainted with Photography could doubt that the process he then described generally was practically the *collodion process*. He stated at the time that he had obtained by it portraits in the shade in five seconds, which no other process could accomplish.

Mr. T. MACKINLAY stated that Mr. Towson, who was at the time connected with the Liverpool Sailors' Home, had, in conjunction with one of the Herschels, produced positive photographs direct in the camera, by a blackened chloride impregnated with an acidulated iodide, both on glass and paper, previous to Mr. Talbot's publication of his process. The lens employed was composed of two meniscuses of equal focus, placed concave side together, at half the focus of either apart, a stop being placed midway. The exposure in sunshine was about twenty minutes.

Mr. TAYLOR, in reply, said that while he quite granted what Mr. TUNNY had said in reference to Le Gray being the first to employ collodion in Photography, yet he must still claim for Archer the "collodion process" as originally published in "The Chemist," and as generally practised in the present day. In reply to Mr. MACKINLAY, he stated that in compiling his summary he had followed the legitimate custom of giving preference to priority of *publication*. Mr. Towson, if he had published his experiments, had evidently done so *after* Fife, who, if he mistook not, had done so in 1839, in the 'Edin. Philosophical Journal."

On the conclusion of the discussion, on the motion of Mr. McCallum, seconded by the Rev. Mr. Raven, a vote of thanks was given to Mr. Taylor for his paper.

The Honorary Secretary afterwards read two letters from Mr. Maconochie Welwood regarding the prize of £10 which he had offered for the best picture, other than a single portrait, by a professional photographer, in the Society's Exhibition. In these letters, Mr. Maconochie Welwood stated that he desired to leave the

whole arrangements, in connexion with the prize, in the hands of the Society. After considerable discussion, it was unanimously agreed that, as sufficient intimation had not been given to enable those interested to make arrangements for competing in the present exhibition, the prize should be postponed till next year. It will accordingly next year be competed for by the professional members of the Society.

It having been determined by the Council that the medals to be given by the Society, for the best two photographs in the present exhibition, should be awarded by the majority of votes of the members of the Society, in compliance with the suggestion of the Council, the meeting then proceeded to appoint scrutineers, for the purpose of investigating and reporting on the state of the votes to the next meeting, on 8th February.

Pau and the Pyrenees, with a slight Sketch of a Photographic Tour made to them through the west of France. By the Rev. T. M. Raven.

[Concluded from p. 132.]

I have only heard of him once since then, when he was in sad trouble, having been stopped on the frontier, where his camera was seized and opened, his papers unpacked, and all exposed to the light; nor was he permitted to take any part of his photographic paraphernalia with him into Spain. His camera they supposed was an infernal machine, with which he intended to make an attempt upon the life of "Her Catholic Majesty the Queen of Spain." The sun rose brightly the day after my friend left us, so we started at once for Luz. Almost immediately after leaving Pierrefitte we entered a mountain gorge, perhaps the most sublime and astonishing of any among the Pyrenees. At the entrance of this pass the road is hemmed in between a perpendicular mass of bare red rocks, the Gave flowing almost level with the path. This, however, soon rises to such a height, that it becomes nothing less than appalling to look down into the abyss where the foaming and impetuous torrent works its way between stupendous masses of smooth black rock. The road, which is hewn out of this solid mass of rock, winds sometimes on one side of the chasm, and sometimes on the other, joined together by bridges made of marble.

I wish that a photograph I have here could give you any correct idea of another road, now being constructed lower down in the chasm, and apparently hewn out almost under the old one. The workmen employed upon it have to be let down and suspended by ropes. Their first task consists in binding twisted twigs strongly and firmly together, and then attaching them to the rocks in the same line as it is intended the road shall take; and where this line is completed, you see workmen standing or kneeling on it, busy with their hammers and chisels, reducing the rock above them. The slender thread on which they stand, with the awful gulf below them, makes one tremble to think what the certain result would be of one false or unsteady step.

After ascending the gorge a few miles further, the little town of Luz is seen lying below one of the grandest of the Pyrenean peaks, which is here seen to perfection. We stayed to breakfast in Luz; and while doing so our guides brought us our horses.

We were soon in our saddles, our guide leading the way with one, on which was packed my camera. At Luz we were met by three friends, who joined us in this day's excursion. About a mile from Luz we passed by St. Sauveur, a small town, which consists of a single street of good-looking houses. For some miles the road continues to ascend—in many places a mere horse-track, cut in the mountain-side, and fenced by a low wall from an abyss of fearful depth. The sides of the mountains are thickly clothed with box, which grows to a great height. Suddenly the character of the scene is altered: the road descends, the foliage disappears, or shows itself only in patches in the ravines, and masses of dark grey rock usurp its place. The noisy waters of the Gave make themselves more distinctly heard, and a few rude cottages appear. Here we saw one that had been crushed to powder by an enormous rock that had fallen from the heights above, leaving nothing standing but one of the gable-ends; so it still remained, and so it will remain "till the consummation of all things," for the mass is too ponderous to be moved by anything short of a convulsion of nature.

We wished to have turned aside at Gèdre, to visit the cascade of Saousa, but Gavarnie beckoned onwards to greater attractions; so we pursued our route, and suddenly lost all thought for other wonders in the tremendous passes which bear the name of "Chaos," and of which the best description can give but a very faint and imperfect idea. The huge masses of rocks strewn along the valley in grand and indescribable confusion defy calculation. There they lie, the consequence of some terrific earthquake, which must have shaken the mountains to their centre when the mighty ruin was effected. It is supposed that the accident may have occurred in the sixth century, when a fearful earthquake visited the Pyrenees.

On the first view of this scene of disorder, it seems as if all further progress was stopped;

but as we descend amongst the enormous blocks, a path is found winding through them which the perseverance of the mountaineers has formed. At one point we had to pass through an immense avalanche, which had fallen across the road. Our horses at first refused to pass through the opening which had been cut through it, but a touch of the whip soon brought them up to their knees in it.

Emerging from this terrific glen, the pastures and fields which surround Gavarnie smile, and welcome the traveller to hopes but ill confirmed when he reaches the gloomy inn, the last and worst in France. A ride of three miles more brought us to the "Cercle" of Gavarnie (which is so named from its being a sort of basin inclosed on all sides but one). At the time we saw it, the depth of the hollow was covered with a thick bed of snow. Of its perpendicular height an idea may be formed by the great cascade, which falls over a surface of rock 1400 feet in height, thus forming the highest waterfall in Europe. The further we went the smaller became our party. Three of us kept together till the snow became too deep for our horses, which obliged us therefore to beat a retreat. The morning was a broiling one, and as fine and clear too as we could have wished. Now we were in the midst of a snowstorm, and sixteen miles from Luz; I did not therefore attempt to take a picture; nor can I say that the scene was such as would give, except under extraordinary circumstances, a pleasing and intelligible picture by photography. We stayed half an hour at the little inn *en passant*, to bait our horses and refresh ourselves, and then started on our return home in pouring rain, with mists that hid all from our view until within a few miles from Luz, when the sun once more broke out, and dried our dripping garments.

We remained a few days longer in Pierrefitte, and from thence went to Lourdes, where we stayed two days to obtain some views of the old château, which was once the key of the valley of Lavedan or of the Gave de Pau, commanding the four roads which unite here from Tarbes, Bagnères, Argelez, and Pau. It is reached by flights of stairs, and entered by a small drawbridge and a door 4 feet high, and only wide enough for one person to squeeze through; but not being strong, according to modern rules of art, is rather of use as a barrack than a fortress. It was long a state prison, and in 1804 Lord Elgin was incarcerated in it by Napoleon, who caused him to be seized in his passage through France from Constantinople.

Bagnères de Bigorre was our next halting-place. In extent it is the most town-like of the Pyrenean watering-places. It is a cheerful town of white-washed houses, situated just where the plain of Tarbes begins to contract into the vale of Campan, and the slopes which bound it, to change from hills into mountains, whose noble peaks and masses rising to the south form the background of all the beautiful views in and about the town, while undulating slopes, trees, fields of maize, vines, and villas fill up the foreground.

To the passing traveller its chief attractions are the picturesque beauties of the valleys and mountains around, which afford endless resources. In the town itself are scarcely any curiosities or sights. It is also rich above all other towns of the Pyrenees in its neighbouring old châteaux and other old buildings, some of which make very charming subjects for pictures. From this place we returned to Pau, passing through Tarbes. This road, like most of those south of the Garonne, is an extremely fine one; it is perfectly macadamized, and admirably well kept; indeed, in this respect the improvement that appears all over France is quite remarkable; but if superiority can be claimed anywhere, it certainly belongs to Bearn and Bigorre. It is not, however, the *condition* of the road between the two towns that forms the attraction. The distance between Bagnères de Bigorre and Tarbes is not more than 5 leagues, and the road thither would seem to be perfectly level were it not for the impetuous flow of the Adour, along the right hand of which we pass, reminding us of the gradual descent to Tarbes, which, as a city, has little to recommend it beyond its situation in the midst of a fertile plain watered by the Adour, some of whose tributary streams run through the streets, imparting freshness and securing cleanliness. It has nothing to reveal to the lover of antiquity—no vestige remaining of the architecture of the period when Tarbes was celebrated as the place where the Black Prince held his court.

The cathedral is a modern building possessing no claim to notice, and, except the Royal *Haras*, there is nothing to detain the traveller.

About half-way out of Tarbes the road lies over a fine table-land, from whence an uninterrupted view of this glorious country is obtained. Rich forests of chestnut clothe the steep sides of this table-land, and stretch far away to the southward, mingling with the well-cultivated plains that border the Gave de Pau. Beyond these rise, in gradual succession, the lower range of the mountains, whose real height is lost in the grandeur of the more stupendous Pyrenean giants extending as far as the eye can reach.

From Pau we intended to go into Switzer-

land for the summer, and to find our way on to Rome, by degrees, before the winter set in. We had got as far as Nismes, when we were suddenly called home to England on business.

Orange is close to Nismes, and no places on the Continent are richer in their Roman remains than these. I had time to see Nismes and all its beauties thoroughly, to fix on all the points from which I intended to have pictures, and was sensitizing my paper for the following day when I received the letter which recalled me home. I had nothing, therefore, to do but pack up all my things in a hurry, and take the first train for Paris.

I trust soon, however, to be able to return to the Continent and carry out my plans, and if I am able to do so, intend to take with me a portrait lens and also a stereoscopic camera, in addition to my one for large views. I think I shall return to the Pyrenees, as there is a large field there for obtaining fine subjects. All other parts of the Continent are much better known and more frequented than the Pyrenees; but no finer or more interesting subjects for pictures can be found anywhere than in that part of France. The Alps are known to us all, by means of photography; but as yet there are few photographers who have ventured among the Pyrenees. I hope I shall be able some day to show you much finer pictures than I am now able to do, and many more of them. During the short tour I made among them the season was rather too early, and I was prevented by snow from visiting many places which I hope to see next summer.

In conclusion, I must thank you for the kind attention with which you have listened to this long, and, I fear, uninteresting paper. I am really sorry to have taken up so much of your time this evening, especially as I had hoped, until asked to read this paper, that we might have had some paper read of more general interest and utility than that of a mere photographic tour.

Carbon Printing. By Mr. John Pouncy.

To the Editor of the Photographic Journal.

Sir,—On reviewing the discussion at your last meeting, on my Carbon Printing process, I am rather amused, if not edified, by the observations of a certain gentleman, who stated, in defence of silver prints being permanent, that there was a certain photograph in a certain book at a certain house in a certain part of London which looks as fresh and free from signs of fading as any of the present time. Here I may remark—what must be evident to all who pay attention to this point—that the majority of silver prints, even of the present time, are not free from signs of fading.

This gentleman acknowledged, in answer to a question put to him, that numbers of photographs in the same book had faded. I need not remind you, Sir, that mere assertions are not proofs.

On Sept. 20th, 1858, an Editor of a photographic paper, bearing the *name* of "News," made a similar statement.

In order to give this individual an opportunity of proving his statement, I paid him a personal visit; but, unfortunately, he had lent it to a friend, and his friend was out of town. I wrote to him some weeks after, begging the favour of his forwarding to me this greatest of all novelties—a photograph, fifteen years old, unfaded—but I have not yet received it, nor an answer to my letter.

It may be that the statement at your last meeting will end in a similar way. But being rather curious in these matters, I have, since the first statement was made, obtained a photograph, published in the Athenæum 1843, which print (or rather the paper on which it was printed) I produced at your meeting Dec. 7th, 1858, quite faded out. At the same time I also produced a book, "Sun Pictures in Scotland," published 1845, containing a number of photographs, all which have faded more or less. If, therefore, one print remains unfaded in the book my opponent alludes to, it only serves to prove in this case that fading is the rule, permanency the exception; and if those gentlemen were to produce the prints they refer to, I, for one, should feel more satisfied. Now, Sir, I think you would have been equally amused, if on the evening of your last meeting I had made certain statements about a certain carbon print at a certain house in the town of Dorchester, of which print I had further affirmed it would stand the most severe chemical test; you would have paid little or no attention to my statements. I think it more than probable that gentlemen who would not believe what they *did see*, might have been still more inconsistent in their expressions; but I have heard and read such strange inconsistencies of late emanating from those of whom we might least expect them, that I am not surprised at anything, and therefore judge it almost surperfluous to ask them the same latitude in establishing my principles of Carbon Printing, they so complacently assume for themselves in opposing them. My case, indeed, is good enough to be independent of any subterfuges; but being so, am I not entitled to expose the course thus adopted by my opponents? I detest professional slang; it is the substance, and not the shadow, for which I contend.

To John Pouncy, Esq.

Birmingham Photographic Society,
January 18th, 1859.

My dear Sir,—I am duly in receipt of the two Carbon Prints you sent yesterday, and I hasten to give you my opinion upon them.

I feel it only my duty to say, that they are *quite* equal to silver prints in many respects, while in others they are far superior to the generality of either direct or developed silver pictures. The only fault that I see is a slight dirtiness of the whites, very slight however, due to the mechanical method of applying the solutions; otherwise they are perfect. Those persons who will venture to pronounce that the process is incapable of improvement, should suspend their judgment until they have seen what I have seen, your first and last specimens. The other statement so confidently put forward by your opponents, that the process is incapable of giving half-tone, is in the pictures before me triumphantly disproved. The picture of the ruin shows a delicacy of half-tone, an harmonious blending of the light and shade, together with sharpness and detail, quite unsurpassed, while it is free from those violent contrasts seen so often in silver prints. The copy of the old woodcut is absolutely perfect: place the original side by side with the copy, and I think it would be impossible for a stranger to declare which was printed from the block, and which by your process.

I beg to congratulate you on your progress, and wish you every success. I have suspended my judgment until you had had sufficient time and experience to produce adequate specimens, and I now give you my opinion, freely and honestly. W. B. Osborn.

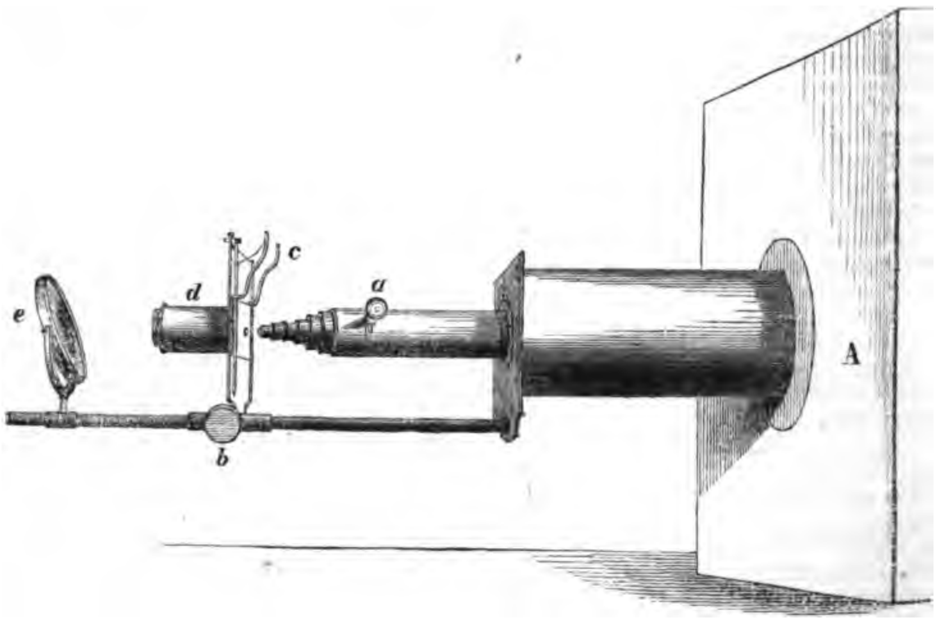
Microscopic Apparatus for Photographs.

To the Editor of the Photographic Journal.

47 Hans Place.

Sir,—I send you, with much pleasure, a sketch and short description of the apparatus I adopt in the photography of microscopic objects, to which I alluded in the paper I had the honour of reading to the Photographic Society on November 2nd, 1858.

It will be seen by the annexed diagram that the whole instrument screws bodily into



the camera, precisely as an ordinary lens does; and thus there is no chance of any shifting, which might occur if the body of a microscope were adapted to a camera by means of a tube of paper or metal. At *a* is a "fine adjustment;" its milled head should be marked off in divisions, by means of which the amount of revolution necessary to correct any difference that may exist between the visual and chemical foci of the lower powers can be easily ascertained.

At *c* are two spring clips, which simply serve to hold the slip of glass on which the object is mounted. By means of the tube *d*, an object-glass of power lower than that used to magnify with, may be made to fulfil the

duties of an achromatic condenser: it is to be understood that a second tube slides within *d*, and it is to an adapter attached to the distal end of the inner tube that the object-glass is made to screw. A coarse adjustment at *b* moves the whole stage, and is of service when using the lower powers, or when it is wished to move the object rapidly. A plano-concave mirror, *e*, completes the apparatus.

It will be perceived that there are no stage-movements attached to this instrument. In the paper to which I have before alluded, I ventured to call them "expensive luxuries," and despite Mr. Shadbolt's opinion, expressed in the subsequent discussion, I must be allowed to consider them so still; for nearly all microscopists with whom I am acquainted do not use them, even if they form part of their instruments,—while, as a general rule, Continental observers employ models which do not possess them at all.

In common with a great many very much more experienced men than myself, I believe that the educated hand is capable of doing all that is necessary in moving objects when under observation; nay, I am inclined to go further, and say that I do not believe that any "stage-movements" have yet been constructed (excellent mechanical contrivances though they be) that are not *inferior* to the hand in their practical adaptation; so that I think that Mr. Shadbolt, in asserting that they are a "*sine quâ non*," advances a proposition which the majority of microscopists will be very slow to adopt.

Trusting that the sketch and the above short description may prove of interest to some of your numerous readers,

J. Reeves Traer.

On Old Silver Baths.

To the Editor of the Photographic Journal.

Sir,—The plan which Mr. Eliot proposes for removing the iodide of silver from old nitrate baths, so as to render them available in the printing process, appears to be one of theoretical as well as practical interest. I have given it a careful trial, and with very good results, although I do not find that the citric acid alone is sufficient in all cases to throw down the precipitate. The presence or absence of acetate may perhaps make a difference; but if the liquid remains clear after adding citric acid, the whole of the iodide will go down in combination with citrate of silver on neutralizing with ammonia.

Mr. Eliot is evidently a practical chemist, and therefore it will be better to leave the matter in his hands; but perhaps I may be allowed to suggest that he should pursue the subject, and prepare, if possible, a definite compound of iodide of silver with citrate of silver. That such a compound may be formed I cannot for one instant doubt, as also others of a corresponding nature, such as iodide of silver with albuminate of silver, iodide of silver with glycyrrhizinate of silver, &c. These matters are important in establishing the theory of the dry collodion processes, which, as they become better understood, will, I think, be seen to depend very much upon affinities existing between the sensitive iodide and organic bodies coagulated by nitrate of silver. Mr. Eliot has certainly every encouragement to proceed in the investigation. F. Hardwich.

HALIFAX LITERARY AND PHILOSOPHICAL SOCIETY.

Exhibition of Photographs.

One of those *réunions* of the members and friends of the Halifax Philosophical Society, involving so much interest and pleasure, took place in the Museum on Wednesday evening last. In addition to its being the annual meeting, there was a large and splendid display of photographic specimens, and a choice collection of improved stereoscopic instruments and slides.

At half-past six o'clock the members assembled for the transaction of business. In the absence of the President, J. Waterhouse, Esq., J. Stansfeld, Esq., was called to the chair. After other business the following paper on Photography, by Mr. Haigh, was read.

Mr. Haigh said,—Having but to-day the honour of being elected a member of the Philosophical Society of Halifax, I have, with extreme reluctance, consented to read a few notes to you this evening on the subject here prominently brought before your notice. Other members are far better qualified than myself to do this all-engrossing topic justice; but their unwillingness has, I may say, compelled me (in my zeal for the art) not to let the occasion pass without a few words of comment. I will not trespass on your time by entering upon the various discussions which every recent discovery has occasioned, but as rapidly and generally as possible, relate the origin, nature, and progress of this the youngest child of science, that the most inexperienced may gain an idea of the boundless field of its operation, and of the inestimable value it has been, and may yet become, in every walk of life. Drawing by means of light, then, to which the term of photography has been generally applied, I would divide into two branches,—viz. The chemistry of photography,

and photography in connexion with the arts and sciences: the former of these I will not enter upon, as it has to do entirely with the practical and manipulatory process, but consider it merely in connexion with art. First, however, it may be interesting to those who are not already aware, to know that, though the philosophers of antiquity appear to have had their attention excited by many of the more striking characters of light, yet we have no account of their having observed any of its chemical influences, although its action on coloured bodies, deepening their colour in some cases, and discharging it in others, must have have been of every-day occurrence. The only facts which they have recorded are that some precious stones, particularly the amethyst and opal, lost their sparkle by prolonged exposure to the rays of the sun; and it was not until the year 1777 that we hear of any philosophical inquiry on the subject. In this year Scheele made experiments on silver in nitric acid, and found that, when exposed to the beams of the sun, it grew black, and that heat, without light, had no effect upon it; he also, by means of the prism, observed that in the violet ray it grew sooner black than in any of the others. Senebier, Ritter, and Sir William Herschel, after this, gave their attention to the subject; but Sir Humphry Davy, in the year 1802, was the first who procured an image of an object by the chemical influence of light: he, however, failed to fix that image; and we have to pass over a lengthened period, in fact until the year 1839, before we find any satisfactory results arrived at. Then it was that Daguerre (after securing to himself a pension of 10,000 francs from the French Government) made known his process to the world. His pictures were produced on metal plates, which, however, were found objectionable from the reflexion, and their not possessing any power of reproduction; and the discovery of our own countryman, Mr. Fox Talbot, which was made the same year, was hailed as a great boon, as, by his invention of executing drawings on paper, an unlimited number of impressions might be taken, the texture of the paper allowing the light to pass through. But this method was at length, in the year 1851, superseded by the introduction of the Collodion process, by Mr. Scott Archer, which was found to combine all the excellencies of the Daguerreotype and Talbotype processes, while it also enabled the manipulator to produce pictures of a larger size, more minuteness of detail—and reproduce, which the former process was incapable of. It had, too, much greater sensitiveness. To this man, Mr. Scott Archer, is due, then, the advantages which we at present derive from this most pleasing art; and it is a painful feeling to think that he, with many others who have done much good service to science, should have left the scenes of their achievements ere they could reap the benefit which might have been derived from them. Having said this much on the development, use, and progress of photography, I would next consider it in connexion with the fine arts. From the facility with which impressions of objects may be taken, great discredit has been brought upon the art, the camera having found its way into hands whose only aim seems to be to produce an image in black and white which may be recognizable. We cannot walk through the streets of any town in this country without our eyes being offended by the sight of pictures of this stamp, whose only redeeming feature is their ugliness. But it is in the hands of the man of taste and the artist, that we may expect to derive permanent advantage: with such men photographs may become fine works of art, taking their stand amidst the best efforts of the best painters; and it is to the furtherance of such a result I would offer the following remarks. First, then, the photographer should think as much of what he means to do as of the means of doing it; for, however good in execution a photograph may be, it is worse than useless if employed on a badly-arranged subject. In instance of this let us suppose the photographer to be engaged on portraiture. Being perfectly acquainted with the qualities of his lens, and the size of the picture it is capable of taking, his first care should be so to arrange the light, that it should not fall too vertically on the head and face of the sitter, as this gives a snowy appearance to the hair, and causes too heavy and dark shadows to be cast on the features; to avoid this, he will find a projection of blue calico very advantageous, acting as a screen to the eyes, and to cast a gradation of shade over the background. The next consideration should be the background, taking care that the figure be well defined, yet at the same time not in too strong a contrast, as the picture should harmonize in all its parts. Another very important point is the position; but as this may be varied to any extent, I will only remark that, as the lens is convex, unless great care is used, the most prominent features may be distorted, made larger than in nature, while those further removed will receive a corresponding diminution of their size. Turning to landscape drawing, we find photography of even greater value, as pictures of the utmost beauty and unerring truth can be produced with lightning rapidity. The reflecting and overhanging cloud, the heaving billow, even the crested and majestic wave ere it breaks

in fury on the pebbly shore, may from its reflecting surface impress its image on the tablet in the camera. Confining myself, however, to what is more generally understood as landscape drawing, I would observe that, except in obtaining a correct outline, the artist would do well to confine himself to such patches of foreground as may serve him in the composition of other works, rather than to the taking of more extensive views, since the detailing of every minute object, even to the leaves of distant foliage, is apt to disturb the harmony by breaking up the broad masses of light and shade which are generally allowed to constitute the chief charm of a picture of this description. There is yet another manner of applying photography—I mean in connexion with science; but as instances of its advantages in this branch might be multiplied to almost any extent, I will only glance at a few of them. To the naturalist and botanist I need not advert; it is too apparent how beneficial photography may be to them in their researches; yet all may not have heard that the weaver and calico-printer have also applied to it for purposes of multiplying patterns, and are at the present time testing the power of certain chemicals for producing copies of natural objects. Turning to astronomy, and connecting the telescope with the stereoscopic camera, we obtain a faithful drawing of the moon and other heavenly bodies. We have one of De la Rue's excellent specimens on the table this evening, which shows not only very clearly the mountains and valleys which mark her surface, but also seems to indicate a period of terrific disturbance long since passed away. Representations have likewise been obtained of Jupiter with his belts and satellites, and no doubt much yet remains to be effected in increasing our knowledge of the wonders of the celestial world. These few suggestions, which I have taken the liberty of making, though hastily put together and very crude, may yet carry the conviction with them, that unless we can thoroughly realize the beauties of nature and regard them artistically, we can never realize the language of the poet, that a "thing of beauty is a joy for ever."

THE EXHIBITION OF PHOTOGRAPHS AT THE EXCHANGE HALL, NOTTINGHAM.

"As regards the educational value of photography, it will, no doubt, become universal. Already the Science and Art Department have had photographs taken from Raphael's Cartoons, the largest size being four feet. We learn that the Departments will shortly be prepared to offer them to public schools at a moderate cost. This is a step in the right direction, and it is to be hoped will lead to something better still,—viz. a permanent exhibition of the arts and sciences, in which the photographic art would necessarily bear an important feature. It would be a place for improvement and intellectual recreation; and no place could be more appropriate than the School of Art, *i. e. when it is built*; and provided the subjects were properly classified, the Exhibition would form a valuable resort for reference to the architect, the artist, the mechanic, and to all engaged in industrial pursuits. Such an Exhibition, especially if good music was introduced at stated times, would be more likely to draw the working classes from pernicious habits than all the platform laments in the world. We have been led to these remarks from actual observation and experience of the last Exhibition of the School of Art, and the present one of the Nottingham Photographic Society, which, we are sorry to say, will close on Saturday.

"The subjects which comprise the works exhibited may be divided into three classes—Architecture, Landscape, and the Figure—and in each class there are some very remarkable and perfect specimens. Architecture is well represented by Le Gray, Bisson Frères, and MacPherson; the large ones by Bisson being most perfect specimens, leaving nothing to be desired, and the illustrations of Rome by MacPherson are most instructive. The 'Two Ways of Life,' by O. G. Rejlander, must rank among the most extraordinary productions that photography has produced. The attitudes of some of the figures are exceedingly appropriate and graceful, though in other parts of the picture there are several artistic defects.

[To be continued.]

REVIEW.

The Literary and Scientific Register and Almanack for 1859 (*eighteenth year*), *by* J. W. G. Gutch, M.R.C.S.L., *late Foreign Service Queen's Messenger.*

This little volume, which is adapted for the pocket, should be in the possession of every photographer. In addition to a series of short treatises on various sciences, and a large amount of useful information on scientific subjects in general, it also contains a carefully-selected series of formulæ from our best writers, arranged in a succinct and intelligible form. The collection of useful tables of weights and measures, as well as of comparative weights, is highly valuable to have at hand, for few of our memories are so good as not to often have occasion for such a reference. The other subjects treated of are marked with that clearness of description which has characterized the volumes of the preceding years. We confidently recommend it to such of our readers as have not already had the good luck to have been favoured by a perusal of it.

ANSWERS TO CORRESPONDENTS.

Gentlemen desirous of admission into the Photographic Society, are requested to communicate with the Secretary, 1 New Coventry Street, Piccadilly, W.

Immediately after the General Meeting on the 1st of February, it is proposed to issue a new List of the Officers and Members of the Society. Gentlemen are therefore requested to communicate any alteration or correction they may wish to appear in such List, at once to the Secretary; and should any of our friends wish to become Members of the Society, by Election on that day, they will do well to intimate their desire without delay.

The business and advertisement department of this Journal being entirely in the hands of Messrs. Taylor and Francis, the Editor must be excused from any want of courtesy in not replying himself to numerous correspondents relating to their arrangements.

Mr. H. R. Smyth (Cliffe Cottage).—The communication was not received by the present Editor: an explanation shall appear in our next.

J. A. (Halifax).—The publishers will attend to your request.

H. L. (Edinburgh).—During a Member's absence from England, after the first year, he is considered as an Honorary Member, and pays no subscription until his return; but the fact should be notified to the Secretary; otherwise our Collector cannot avoid applying for the Annual Subscription as he would do to any other Member.

C. J. Hughes.—Mr. Hughes wishes us to make the following correction in his reported observations at the last meeting:—

"What I said was, that daguerreotypes did not fade; though I freely admitted that when suspended in smoky atmospheres they frequently sulphuretted, but that all skilful daguerreotypists knew that a dilute solution of cyanide of potassium removed the blue film and made the picture as brilliant as ever; but I added, *in derision*, 'Did any one ever try the same remedy for a faded print?' 'Yes,' said Mr. Delferrier. 'And what was the result?' I replied. 'Out!' was the laconic answer."

We may here observe that we have in our last accurately reported the words from our shorthand writer's copy. It is very difficult to correct a speaker's observations without his presence. The late hour at which the shorthand writer's copy comes to hand precludes, to a great extent, a personal revise by the Member. If, however, any one who has addressed the meeting will favour us with a visit at our Rooms in Red Lion Court on any Thursday afternoon succeeding the meeting which takes place on Tuesday, their presence will be welcome, and perfect accuracy be secured.

W. G. (Jan. 18.)—Thanks for your good wishes.

1. You may purchase the soluble cotton in small quantities, it is carefully made, at most of the photographic chemists'. 2. It is not needful to keep up the temperature in making pyroxyline after you have started with a sufficient temperature. 3. Our experience is not in accordance with your own in finding that the alkaline toning-bath dissolves out more of the half-tints than other processes; but, on the contrary, one of the great beauties of both Mr. Hardwich's and Mr. Maxwell Lyte's baths published in this Journal, appears to be the preservation of half-tones: we have used the common citric acid of the shops. A new edition of Mr. Hardwich's excellent work is now nearly ready for delivery, and will contain much original matter.

The Exhibition.—In the Catalogue, No. 346, contributed by Messrs. Murray and Heath, is described as taken with "the new patent 14-inch Jamin lens"—it should be "6 inches," which of course is an error of importance when the object has been to exhibit the powers of a lens of a particular size.

In the next edition of the Catalogue the error will be corrected.

A. Y.—A free admission to the Exhibition in Suffolk Street, for "Editor and friend," has been, or ought to have been sent to the members of the various periodicals which take an interest in our art. If, on inquiry at your office, such card has not been received, another shall be forwarded upon application to the Secretary.

F. J. (Amateur, Mile End).—If you will write to the Secretary, your admission to the Society shall take place. The four volumes of the 'Photographic Journal' are always kept ready bound at the Office. The Numbers which were out of print have been reprinted; and now any separate back Number can be procured.

G. B. S. (Guernsey).—The fault is evidently in cleaning the glasses. There is often a difference in samples of collodion as to the requisite care required in this respect; a weakly iodized collodion shows defects more readily than that which is more freely iodized. If you use sulphate of iron and nitrate of barytes to produce a protonitrate of iron for your developer, you will obtain more agreeable results than by the use of sulphate of zinc. A small quantity of acetic acid, say a drachm to the ounce of solution, is required.

Permanent.—1. The dry plate process of Dr. Norris has been printed in our back Numbers, to which we must refer you. 2. Do not concern yourself with any secret process; if it will stand the test of public opinion, it is sure to be published. 3. We have no confidence in two or three minutes' washing to secure permanence, and have no personal experience.

J. A. (M.D.)—Every card of invitation sent by post both to the private view and Soirée should be delivered free: probably the stamp had been rubbed off in transmission.

R. W. Grice.—You shall receive a photographic landscape as a specimen very shortly.

T. L. (Suffolk).—We have seen excellent views done with an Archer's lens and camera; but for pictures above 6 or 8 inches in size, it is difficult to use. The late Mr. Archer contrived a sort of shade inside to shut off light at the top of the picture, and which he could so regulate that he succeeded tolerably well in taking clouds, which require so short an exposure compared to the rest of the picture.

Errata: No. 75, p. 117, *for* "capped" *read* "tapped."
No. 76, p. 130, *for* "manuscript" *read* "codex."

A description of a New Lens, by Mr. Sutton, and Cemented Achromatic Lenses, by Mr. Goddard, in our next.

Communications Received from H. R. Smyth; Alfred Keene; T. Sutton; O. G. Rejlander; T. S. Reeves; Isaac Yeoman; F. Giesler Lloyd (in our next).

Letters of inquiry to the Editor can only be answered through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers, Messrs. Taylor and Francis, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 78. FEBRUARY 5, 1859.

PHOTOGRAPHIC SOCIETY, LONDON.

Annual General Meeting.

1st February, 1859.

The Right Hon. the Lord Chief Baron, F.R.S., President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The following were elected Members of the Society:—

The Right Hon. The Lord Londesborough.
J. P. Gassiot, Esq., V.P.R.S.
The Rev. William Le Mottée.
Ernest J. Craigie, Esq.
Mr. A. C. C. Beer.
Capt. A. E. Ross.
Philip Badcock, Esq.
George Matthews, Esq.
Mr. Thomas Ogle.
W. Jackson, Esq.
Henry G. Wright, Esq., M.D.
Mr. Edward L. Adey.
Mr. J. Cruttenden.
Harry Ker Ennes, Esq., Surg. 60th Rifles.
C. A. Elliott, Esq.
Michael Hannaford, Esq.
Edward Haigh, Esq.

The Chairman.—Gentlemen, as this is our Annual Meeting, you will have to hear the Report prepared by the Council, of the progress of the Society, and of all matters that they have thought it necessary to lay before you for your consideration. I am very happy to have hardly anything but good to report of the past, and, I think, to anticipate of the future. It may be a matter of some regret, that, in reference to the finances of the Society, I have to report somewhat of a falling off; but, Gentlemen, I have not (like the Chancellor of the Exchequer in the House of Commons, when he reports a deficit) to propose the laying on of any new taxes. It is not suggested that we need increase our subscription or enlarge the price of admission to the Exhibitions, or take any other step, the tendency of which would be to improve the revenues of this Society: they will, as everybody ought to do, improve themselves; and there are sure signs that they will do so. The deficit unfortunately arises from the failure of our (I suppose in this country there is no harm in saying our commercial speculations in reference to our) Exhibitions at Kensington, and, I am sorry to say, Gentlemen, under the roof where we are now assembled. A proposal was made that we should accept certain apartments at Kensington (you know the place that I am alluding to, the new building that has been erected there for the purpose of the promotion of good taste, science, and literature); a proposal was made that the Society should exhibit at the Gore House, Kensington. They did so; and the result has been a loss of between £40 and £50; and the Exhibition that took place in this house (in these apartments I should say, for we do not occupy the whole of the house) occasioned another loss of, I think, about £60.

Gentlemen, we are, I am quite delighted to say, though it may not redound to the wisdom of the Society—we are become wise by experience; and it is not, according to the proverb, the wise who become so, I regret to say.

We do not intend in this year to exhibit in these rooms: they are somehow or other out of the way; and though they are convenient enough for the ordinary buisiness of the Society, they (for some reason or other) are not frequented sufficiently to justify our having an Exhibition here this year: and we have, as

you all know, taken premises somewhere else, where the Exhibition goes on with every prospect of very great success; and I cannot help observing that, upon the opening of that Exhibition, there did appear to be a very great increase of skill, and such as to draw forth the praise of every body. His Royal Highness the Prince Consort, whom I had the honour to attend the day before the Exhibition was opened, was exceedingly minute in his examinations; he spoke of the Exhibition as being very creditable to the Society, and stayed there a longer time than he had ever remained at any other of our Exhibitions. I believe I may speak of the present Exhibition as one of the best that ever graced the annals of this Society.

We have to mention the novelty in the Exhibition, of Photographs prepared by charcoal. One of the matters which has interested the Society very much is the obtaining something which shall be permanent, and which shall make the result of the labours of the Society last for ever. Upon that subject very great attention has been bestowed; and it is important, because no doubt a very large proportion of the claim of the Society to public utility arises out of the permanency of the labours of the Members of this Society. Now, if there be any subject whatever, any material, anything, that can be applied to photography apparently most permanent it would be carbon, which, of all substances, appears to be the most indestructible by mere time, and least liable to decay. It is itself, according to the chemist, antiseptic, in the strongest degree, and is itself really imperishable. I apprehend that, if a piece of charcoal had been buried in the days of Adam, and dug up yesterday, it would be found to be just in the same state as when deposited; and therefore, when one sees the application of that substance in the photograph I now hold in my hand, I think you will be glad to discover that there has been the application of a substance so indestructible to the purpose of photographic printing. In the last Exhibition there were some specimens of carbon-printing. I do not pretend to say anything about either the process or the inventors, more than that it is by some persons considered to be a very great improvement. If it succeed, in all probability it will produce a result most acceptable to those who consider photography a permanent record of all matters belonging to society; and I think we may hail it as an improvement, as an advancement in the right direction.

Gentlemen, I am sorry to say that the prospect which appeared when I had the honour of addressing you last year has not been realized; and the experiment does not appear to have been repeated by any other person than the celebrated foreigner* who communicated it. I understand that neither Mr. Hardwich nor any other person has repeated it with success—at the same time I think it is perfectly fair to say that, in all probability, there has been no misrepresentation on the part of the eminent foreigner who made that communication; and we have reason, I think, to hope that, either from the want of intensity of light, the time in experimenting, or the want of a very sensitive paper, the experiments have not been repeated under circumstances so favourable as those which led to the original discovery.

With respect to light itself, I am unable to report any progress of any sort. I am not aware that we have contributed to any discovery with respect either to what light probably is, or to any decisive opinion of either the theory of Newton, which was that of bodies progressing from the centre of light with great velocity, or the vibratory theory, which is more generally received. I was a few days ago at the Royal Institution, where I heard a very learned and most interesting lecture, boldly throwing out some doubt as to what light really was, and repeating an opinion of Sir Isaac Newton that probably light might be to gas what gas was to fluid—suggesting that all bodies are capable of being in a solid, a liquid, and in an aëriform state, but that light bore to these a sort of relation to gas, such as gas bore to fluids. Gentlemen, I own we have made no progress in photography which justifies any such notion, or which throws any light upon the subject. I heard the lecture I allude to with the greatest admiration; a larger display of talent, genius, and ability I have rarely met with; and I own, notwithstanding the great and immortal name of Newton, and the much-admired and respected name of Mr. Grove, I could not enter into the notion that there was a fourth form of matter different from, but, as it were, correlative with the solid, the fluid, and the aëriform; and whether it was that I have been accustomed for many years to associate in my mind that, as there are but three sets of geometric bodies, the line, the plane, and the solid, and nobody can even conceive any, what we mathematicians—(for humbly, Gentlemen, I consider myself as among that class of persons)—we cannot conceive any fourth power, so I own I cannot conceive any state of matter which is not either solid, liquid, or aëriform. Gentlemen, I am sure you will forgive me for making these allusions; but having repeatedly said that I believe the ultimate labours of photography will be to bring about, if not a perfect theory of light,

* M. Victor St. Niépce.

great advances towards a knowledge of many of its properties, I have thought it right to mention this in connexion with the subject which is the fountain, in fact, of our existence. Light is like the air we breathe; light to the photographer is like air to animated nature; and I was anxious to say a word or two in reference to what has now passed before the scientific world, in order that you might know at least what was my view upon the subject of light. I own, it appears to me that light is nothing but a vibration of a fluid of extreme tenuity. We have the example of sound, which is known to be the vibration of the air which we breathe; and light is, probably, nothing but the vibration of an exceedingly attenuated medium, as much more attenuated, probably, as the velocity with which it travels exceeds the immense velocity with which sound travels; and I shall be very happy to find the first occasion when we are not only able, as a Society, to furnish examples of that which perpetuates art, which encourages science, which promotes all the domestic feelings, which records events and which gives perpetuity to matters of daily life—I shall be very happy to find when we have added to these useful purposes anything that can be called a philosophical addition to the knowledge that we have of the properties of light.

Gentlemen, we have, as you see, to-night a large increase of Members; we have every prospect of our Journal being the source of increased income. The Society appears to be progressing in every way; undoubtedly it is becoming more and more useful, and most useful and advantageous to the public; and I shall be most joyful when I can add to all that it has contributed one scientific fact well ascertained, that shall add one item to the immense mass of philosophy that now pervades it.

The Secretary read the Report of the Council and the Balance-sheet of the Society, as follows:—

Report of Council.

At the meeting held on this day it is the duty of the Council to present to you their Annual Report upon the state of the Society. It has been customary to connect with that a short review of the progress which the art has made during the year; and happily no anniversary meeting has yet passed away without recording, as the fruit of the year's labour, the acquisition of some new treasure from nature's inexhaustible mine of wealth.

Nor will this year be an exception to the usual rule. We have to congratulate you upon progress made in many of the routes along which photographers are pursuing their researches. In the production of negative pictures the old wet-collodion process still maintains its preeminence. It appears, indeed, to have been but little improved in the theory of its working, but to have become more certain in its results, partly through the increasing care bestowed upon the preparation of materials, partly through the growing experience of its followers.

There are, however, coming into rivalry with it, various modifications of the dry-collodion and albumen processes, which, in addition to their acknowledged superiority in convenience of application, are beginning to dispute the palm with the wet-collodion process in perfection of result. To the truth of this observation, the Society's Exhibitions of the past and of the present year testify most forcibly; nor will it be necessary for you to be referred to the names of those whose efforts in this direction have been most successful, since doubtless you have gone along with them in their labours, and shared in the pleasure of their success.

It is, however, for the improvement in the art of printing that the past year is especially notable. By the general adoption of the alkaline toning and fixing bath the ordinary chloride-of-silver print has been made both more beautiful and more permanent, while at the same time the translation of the photographic original, by transferring it to steel, copper, wood, and the lithographic stone, has been perseveringly studied. Though it cannot as yet be said that any of these methods of carbon-printing have attained such a result as will satisfy their inventors or the public, still the difficulties which beset them are being lessened, and the conditions of success more clearly and more generally understood. A fifth method of printing in carbon, which has lately been brought prominently before you—and which has this especial advantage, that it is, like the silver print, a direct translation of the negative—is perhaps the most valuable acquisition which the art has made during the past year. It rests with the inventor of the process, and those who under his directions are experimenting upon it, that to its undoubted merit of superior solidity it shall add a quality of tone equal to the mellow richness of the silver print.

The increasing interest which the general public feel in the wonders of our art is evident not only from the many new photographic publications of various degrees of merit, of which the past year has witnessed the birth, but also from the frequent notice in the daily and weekly journals of photographic questions, a silent but forcible proof of the growing popularity of the art.

The number of exhibitions and conversaziones in the principal towns of the kingdom, in which the productions of photography have formed the chief element, has never been so great at any former period, as during the past months of the current winter season. The commercial applications of the art are rapidly multiplying; and (which cannot but be gratifying to those of its followers who remember the outcry raised against it as a mechanical process) it is at last being discovered that the photographer may employ the pencil of light not only to delineate crude and literal fact, but to convey a sentiment, to excite the imagination, and set the fancy dreaming.

But leaving the general question of the progress of the art, we come now to the more special business of the evening—the position and affairs of the Photographic Society. Of these the Council regret that they cannot present an entirely satisfactory picture; for, on reference to the financial report, it will be seen that the expenses have been £55 in excess of the receipts. Of some of the causes of this excess it is not necessary to say more than that they have been removed. The Council and its officers are now alike animated with the earnest desire to work heartily together for the prosperity of the Society; and where there is union there is strength.

The principal cause of the deficit, however, has been the difference of opinion which existed in the Council, and in the Society, as to the proper time and place at which the annual Exhibition should be held.

It was strongly urged on the one side, that, as the Society had provided rooms at a very considerable expense, the Exhibition ought to be held in these rooms, and thus have the advantage of being open at the time when London is most full of visitors, and the weather most favourable to sight-seeing.

Following out this view, the Council did not engage, as usual, the Gallery in Pall Mall, in which had hitherto been held the winter Exhibitions of the Society. This decision was received with much dissatisfaction; for on the other side it was said that the rooms of the Society were not suited for the purpose of an Exhibition, and, though very conveniently situated for the meetings of the members, were not so placed as to be likely to be much frequented by the general public.

It was under the influence of this reaction that the kind offer of the Commissioners of the Kensington Museum, to allow us the gratuitous use of one of their Exhibition rooms was accepted.

Thus were held both a winter and a summer Exhibition, each of them resulting in a deficit, —the first of £42 5*s.* 9*d.*, the second of £69 18*s.* 10*d.*

If there had been but one Exhibition producing even no surplus of profit, but simply paying its expenses, the balance-sheet would have been satisfactory in its result; it would have shown a surplus of £55.

There is good reason for hoping that the Exhibition of the present year will be of a much more encouraging character.

The management of the Journal has occupied much of the attention of the Council during the past year. With a view of increasing its efficiency, they have commenced the publication of a second Number in each month during the session of the Society.

It will be seen by the balance-sheet that the Journal accounts present a considerable surplus on the favourable side. It was not with any idea of increasing the funds of the Society that the Photographic Journal was established, but simply that the members of the Society, who through their distance from town or press of business are unable to attend our meetings, may be kept *au courant* of all that is passing in the photographic world. It has well fulfilled this intention; and it must be gratifying to the Society to find that the strict impartiality with which it is conducted, and the care which is taken by the Council to guard it from ever becoming the medium of unsuitable personal discussions, or the organ for promoting individual interests, have obtained, for it the confidence of the general body of photographers to so considerable an extent.

It is the strong wish of the Council to make the rooms in which we meet more useful than they have hitherto been. A commencement has been made towards effecting this result during the past year. Most of the periodicals published here and on the Continent, upon the photographic art, are now to be found upon our table. Others will shortly be added; and it is hoped that, with the aid of the general body of our members, we shall soon have a complete collection of the literature that has reference to our art.

The Society ought also to possess a connected series of specimens of the different forms which the art has assumed since its first creation.

The formation of such a collection is daily becoming more necessary, and at the same time more difficult, as those who were the first to enrol themselves in the photographic army are passing away from amongst us.

Such a collection of specimens of various processes, of records of successive discoveries, would be invaluable for reference, not only for its antiquarian interest, but by its preventing the waste of time and talent which now con-

stantly occurs in the rediscovery of methods long known and for good reasons abandoned.

The materials of such a collection can only be obtained by the contribution of individuals; and to the members of the Society the Council must appeal to aid them in its formation.

It has been already announced in the pages of the Journal, that it is intended to present to each member of the Society, during the current year, a copy of some photographic work approved of by the Council.

To avoid the difficulties which existed in any plan of purchasing photographs for distribution among the members, some of our number have kindly offered to contribute copies of some of their favourite works. It needs, however, still the cooperation of a few more persons before we can be sure of our power of presenting to each member of the Society, during the year 1859, a good photographic picture.

We have now passed in review the principal matters which have affected the Society during the past year. Though the result is of a mixed character, of good and bad fortune, still those who were aware of the difficulties which gathered round us in the early part of the year, and which have been met and overcome, will augur well of the future prosperity and usefulness of the Society.

The Council will continue, as they have hitherto done, to administer the affairs of your Society with the firm conviction that its growth in usefulness is the necessary condition of any increase in its prosperity.

Dr. Income and Expenditure Account. *Cr.*

Dec. 31, 1858.	£	s.	d.	Dec. 31, 1858.	£	s.	d.
To Entrance Fees and Subscriptions	433	2	6	By General Expenses	601	7	1
Photographic Journal	242	10	3	Exhibition, South Kensington	42	5	9
Interest Account	9	3	1	Do. Coventry Street	69	18	10
				Property Account, for 10 per cent.	27	13	1
Total Income	684	15	10				
Capital Account for Balance	56	8	11				
Being an excess of Expenditure over Income							
	£741	4	9		£741	4	9

29th January, 1859.
Examined and approved,
R. V. HEATH,
ARTHUR R. HAMILTON. } Auditors.

Dr. The Photographic Society, General Balance, December 31st, 1858. *Cr.*

Dec. 31, 1858.	£	s.	d.	Dec. 31, 1858.	£	s.	d.	£	s.	d
To sundry persons	228	14	5	By sundry persons				£390	11	7
For Balances owing to them.				For Balances owing by them.						
To Capital Account	1162	4	8	By Cash Account:—						
For Balance.				For Balance at Bank	£119	15	6			
				Petty Cash in hand	15	13	10			
				Do. per W. Crookes	4	2	8			
								139	12	0
				By Three per Cent. Consols... For £418 stock.	400	0	0			
				By Property Account For Estimated Value.	245	0	0			
				By Photographic Journal ... For Value of Stock.	215	15	6			
								860	15	6
	£1390	19	1					£1390	19	1

29th January, 1859.
Examined and approved,
R. V. HEATH,
ARTHUR R. HAMILTON, } Auditors.

Mr. BISHOP remarked upon the Auditors' statement of their approval of the accounts.

The CHAIRMAN.—I am not aware whether I quite understand the scope of the member's observations. By "examined and approved" I apprehend that the Auditors mean nothing more than that they examined them and found them correct; to have examined them and nothing more would have been useless; to approve without examination would have been perhaps still worse. I think it merely means, "We, the Auditors, appointed by the Society, have examined the accounts;" that is, we have compared the statements with the vouchers and find that there has been authority to pay all the bills, and that the receipts appear to be correct. This the individual members of the Society cannot possibly do; and that is the reason why Auditors are

appointed. It is impossible for this assembled company of gentlemen to go into the accounts. If any gentleman is aware of anything wrong, or to which it is proper to object, it is competent to him to point out to the Society that real or supposed error; but I am not aware that it is usual to do more upon occasions like the present than to lay the accounts before the Society; and, in fact, the Auditors are the judges selected by the Society to do the duty which we are bound to suppose they have rightly and correctly performed. It is in consequence of our incapacity, or our ignorance, that we have appointed persons to perform that office; and they have examined the accounts and reported that they found them to be correct. They do not mean to say that they approve of the expenditure; they do not mean to say that it is right any of the money should be spent; but they mean to say,—"We have examined the accounts; and we find that the money has been received, and the money has been expended, as the accounts profess it to have been received and expended."

Mr. BISHOP suggested, that the very clear views expressed upon a former occasion by the Auditor, Mr. Marshall, who went into the subject with enthusiasm on that occasion, and laid down very clear views for the guidance of the Treasurer, should in future be adopted and carried out, in which case every one would be able to understand the accounts.

The CHAIRMAN.—It is quite competent at any time,—not merely at this Annual Meeting, for the Society meets much more frequently than once a year,—it is quite competent for any gentleman to give notice that at a subsequent meeting he will move a distinct resolution as to any part of the accounts. The 6th Rule is,—"The Annual General Meeting shall be held on the first Thursday* in February in each year, for the election of Officers and Council for the year ensuing, for receiving the Report of the Council on the state of the Society, and for any other business *of which due notice shall have been given.*"

Mr. LE NEVE FOSTER moved the adoption of the Report, which was duly seconded.

Mr. SEDGWICK referred the Chairman to his statement to the meeting in March last as to the new laws, and asked whether anything had been done with them.

The CHAIRMAN.—All the information that I can give upon the subject is this,—that the laws, although adapted to the embryo state of the Society, were undoubtedly found to be liable to objection. We were promised that the Council would consider the matter and amend the laws; a Committee was appointed, and suggestions were made. In the result, the Council were not able to adopt any amended laws that were satisfactory, and the matter stands over. We are familiar with that in Courts of Law, where a matter stands over for future consideration; and it is a circumstance which occurs in larger assemblies than the present, having business of great importance. Being unable during the last Session to accomplish the object, we shall give it our very best attention.

Mr. BISHOP asked for information as to a Bill in Chancery.

The CHAIRMAN.—I believe that a Bill is about to be filed, if it has not been actually filed; but it is right to state in matters of this sort it is like diplomatic arrangements in another assembly. It might be very prejudicial to the interests of the Society if communications were made pending the progress of a law-suit.

Mr. BISHOP asked whether the expenses of the litigation were to be paid out of the funds of the Society.

* Now the first *Tuesday*.

The CHAIRMAN.—Of the Society—for whose benefit the suit is commenced.

Mr. BISHOP.—By whose leave?

The CHAIRMAN.—By the authority of the Council.

Mr. BISHOP.—Then I think they ought to let us know what they are going to do; because, then, we can judge whether we are to support them in a litigation of which none can tell the end.

The CHAIRMAN.—However popular that opinion may be, I think it would be very strange if the Council were compelled to ask the members to enable them to take steps to protect them. It would be analogous to the House of Commons taking steps only by leave of the country, or Ministers taking steps only by leave of the House of Commons. If you have no longer any confidence in your Council, dismiss them. [Pointing to the balloting papers which were about to be used.] Suppose that some wrong is done, which it is the interest of the Society instantly to redress, by applying to the Courts of Law immediately, and not to wait for any length of time, though it may be a question, by-and-by, for a meeting to say that all this is wrong, yet I think that the Council are perfectly right in doing what they think is for the interest of the Society.

Some discussion then took place, in which Messrs. Malone, Fenton, Le Neve Foster, Bishop, the Secretary, and other Members of the Society took part, as to the Journal, advertisements, reporting, &c., in which it was distinctly stated that the Society had nothing to do with the advertisements, and that they were under the *exclusive* management of the publishers.

A Member asked, what was the number of the members?

The Chairman: At the end of the year, 421, which was an increase.

Mr. Bishop moved as an amendment, that the consideration of the Report be adjourned until the next Monthly Meeting, which was duly seconded, and upon being put to the Meeting negatived.

The motion was then put and carried.

Messrs. Davis and Durham were appointed Scrutineers, when the following were declared to be duly elected: *President*—Sir F. Pollock, F.R.S., Lord Chief Baron. *Vice-Presidents*—Peter Le Neve Foster, Esq., M.A.; C. B. Vignoles, Esq., F.R.S. *Treasurer*—Alfred Rosling, Esq. *Council*—T. G. Mackinlay, Esq., F.S.A.; C. Thurston Thompson, Esq.; Henry White, Esq.; J. D. Harding, Esq.; N. S. Maskelyne, Esq.; Edward Kater, Esq., F.R.S.

Mr. Bishop, in a complimentary speech, moved a vote of thanks to the Chairman, which was seconded, put, and carried unanimously.

The Chairman expressed his sense of the compliment.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and ad-

dress of the writer; not necessarily for publication, but as a guarantee of his good faith. The same proviso extends to communications to the Editor.

THE PHOTOGRAPHIC SOCIETY OF IRELAND.

HAVING lately been affiliated with the Royal Dublin Society, the first meeting under the new arrangement was held in connexion with the Fine Arts department, and in the School of Art of the Royal Dublin Society, on Friday the 28th of January.

GILBERT SANDERS, Esq., President of the Photographic Society, in the Chair.

The President congratulated the Society on their present favourable position, especially as having their proceedings associated with those of the Fine Arts portion of the Royal Dublin Society; and alluded to the beneficial effects likely to result from the system which the Photographic Society of Ireland has lately adopted, on the recommendation from its Council made in the early part of last year, of giving prize medals for the best photographs by members of the Society in the several departments of Figure and Landscape, both by glass and paper processes, and also for artistic arrangement of subject; and likewise alluded to the intention of the Council to present each member of the Society with copies of the prize-photographs.

B. MULRENNIN, Esq., R.H.A., at the request of the Society, read a paper on Photography as applied to certain branches of the Fine Arts; and having glanced at photography in its general or popular character, in which he paid a just compliment to the genius of the late sculptor, Hogan, proceeded to consider its productions, if judiciously applied, as important auxiliaries to painting, but more especially to portraiture. Mr. M. proceeded to describe a process by which photographic portraits may be translated into miniature paintings on marble and ivory, some fine specimens of which were laid upon the table. The process may be briefly stated as follows:—Having obtained the photograph by the usual means, it is then applied to the surface of the marble in such a manner as to leave a sketch of the outline and the more important shades. The portrait is then finished by hand, and must of course take higher rank as a work of art than in the case of a mere coloured photograph. In the process brought forward by Mr. Mulrennin, no part of the photographic film is allowed to remain upon the marble, &c.

An interesting discussion ensued, after which M. ANGELO HAYES, Esq., R.H.A., read an exceedingly pleasing communication on the aids which artists derive from photography in securing copies of their own pictures by its means: he pointed out the many defects in photography when required to deal with certain colours in pictures to be copied, and gave a most humorous account of the numerous disappointments which he had to encounter in trying to obtain a photographic copy of his picture of "The Kildare Hunt." Mr. Hayes exhibited a successful photograph of this fine picture, which was greatly admired.

SIR J. JOSCELYN COGHILL, Bart., gave a most gracefully-written, highly animated, and humorous narrative of a recent photographic tour in Spain and Portugal, and exhibited some charming views for the stereoscope taken in his wanderings in the South of Europe.

He gave some excellent advice to field photographers, and was "fearfully down" on some of the recently invented "jim-cracks" intended to delude zealous amateurs in photography. The paper which he read contained all the charms of a narrative of travel, with the addition of being highly instructive in an artistic point of view to his hearers.

On the motion of the Chairman, the marked thanks of the Society were given by acclamation to Sir J. Coghill for his interesting communication.

Several new members were admitted, and the Society adjourned to Friday the 25th of February, on which evening the photographs for competition are to be exhibited, and the prizes awarded.

A New View-lens.

To the Editor of the Photographic Journal.

SIR, — The following account of a new View-lens which I have invented, and which appears to possess some important advantages, will I hope interest your readers. In sending you the particulars of it for publication in the Journal of the Photographic Society, prior to my publishing them in my "Photographic Notes," my wish is that the act may be accepted as an acknowledgment of my friendly feelings towards the Society, and my desire for its continued prosperity.

In order to prevent misapprehension, I will preface my description with stating that my lens has not been patented, and that I intend publishing shortly in a pamphlet the *complete* mathematical theory of it, with the necessary formulæ for determining the radii of curvatures

corresponding to the various qualities of glass; —so that any optician may, if he choose, manufacture the lens for sale. My invention is therefore a free gift to the public; — but at the same time I have arranged with Mr. Ross to manufacture and sell the instrument for me, under the title of "The Architectural View-lens," or, briefly, "Sutton's Triplet."

I will now proceed to a description of the lens; the advantages of which are—

1st. *Absolute* freedom from distortion,—a point which has not been accomplished in any other photographic lens.

2nd. An absolutely flat field for the image of a flat object. This also is a point which has not been accomplished in any other lens with which I am acquainted.

3rd. Equality of illumination in every part of the picture. This point my instrument possesses in common with the orthoscopic lens of Professor Petzval.

4th. An unusually wide angular field of view included.

Such are the advantages of the instrument, which I have both demonstrated theoretically and proved practically. I know of no practical disadvantage which it has, except that, in common with all other view-lenses, it necessitates the use of a small stop. But I believe it will be found both practically and theoretically impossible to include satisfactorily an angular field of 45° with any optical instrument having a large aperture. It is a known principle in optics that the focus of an oblique pencil refracted through a lens is split up into two lines at right angles to each other, and at some distance apart, between which is a circular space called the "least circle of confusion," which is the smallest space through which all the rays pass, and therefore the nearest approach to a true focus. Now as the obliquity of a pencil increases, these focal lines become more and more widely separated, and the circle of least confusion increases in diameter; so that the unavoidable indistinctness of focus of a *large* oblique pencil becomes quickly apparent, and the only remedy for pencils of great obliquity is to diminish the aperture by means of a stop. This is true of all lenses whatever; and my lens is therefore not free from a fault inherent in all lenses, and which never has been and never can be got rid of to the end of time. In the telescope the obliquity of the large pencils introduced is inconsiderable, and in the most powerful instruments it does not exceed a few seconds of a degree. In the microscope also, with the high powers, the obliquity of the lateral pencils is small, since the size of the object examined bears not a small ratio to its distance from the object-glass. In the common portrait-lens with full aperture, the marginal objects speedily lose the perfect definition which may be obtained in the centre, and the angle which can be satisfactorily included by such a lens with full aperture does not exceed 15°. But in taking photographic views an angular field of from 35° to 45° is generally required to be covered sharp to the edges, and to do this with any instrument, however perfect, a small stop *must* be employed. For such purposes the optician is *compelled* to introduce it; and if very quick or instantaneous pictures of this wide angular extent of field are required, the photographer must look to the chemist for the solution of the problem, and not to the optician, for the latter cannot do what is proved to be theoretically impossible.

A small stop is therefore a necessary part of my combination of lenses for views; but I do not find any real objection to a small stop in practice, nor do any of the successful photographers with whom I have compared notes on this subject. In taking out-of-door subjects I invariably get a clearer and better picture with a small stop and suitable exposure than with a large stop and a shorter exposure. When the light is strong and good, I think it always better, with any instrument, to use the smallest stop and give a long exposure; at any rate this is the best plan with architectural subjects, or views in which no moving objects are introduced. If it be required to take instantaneous pictures including a wide angle of field, then I think that recourse should be had to the Panoramic Camera which I have described in my "Notes," armed with a portrait-lens; and I believe there is "a mine to explore," as the French say, in this direction.

But a small stop does not cure distortion, nor does it insure equality of illumination, and therefore a bad lens cannot be converted into a good one by the introduction of a small stop; and as regards distortion, the lenses now used by photographers are all more or less bad, while mine is free from this defect, as I will proceed to show.

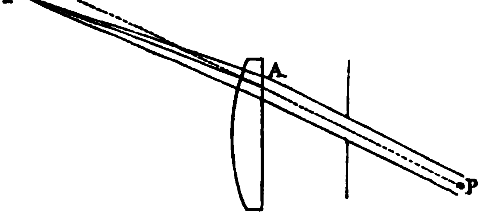
Distortion is produced by the deviation which the axis of an oblique pencil undergoes in passing through an improperly constructed system of lenses; and in order that there may be no distortion there must be no deviation;—that is to say, the axis of every oblique pencil must at emergence from the back lens have its direction parallel to that which it had at incidence upon the front lens.

If instead of a lens a small hole be made in the front of a camera, there is no distortion in the image upon the focusing screen, because none of the oblique rays suffer deviation, but pass straight through the hole.

If instead of a small hole a small convex lens be placed in the camera front, there is no distortion; but the foci of the marginal pencils do not fall upon the focusing screen, and the marginal parts of the picture very quickly become indistinct as they recede from the centre. This arrangement is therefore useless.

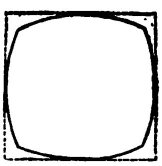
In the common view-lens with a stop in front there is more distortion of the image than in any other optical instrument with which I am acquainted, and the reason will be perceived by referring to the following diagram.

Fig. 1.



An oblique pencil from an object P is incident at A, and instead of passing straight on to the point *p*, where the image *ought* to be formed, it is bent out of its course *towards* the axis of the lens, and the focus is formed at *p*. The angle P A P is the deviation in the axis of the pencil P A. The deviation increases with the obliquity of the pencil, and the effect is that the marginal objects are compressed and forced towards the centre of the picture, so that the images of straight lines are curved at their extremities, as shown in Fig. 2, instead of being straight, as shown by the dotted lines in that figure.

Fig 2.



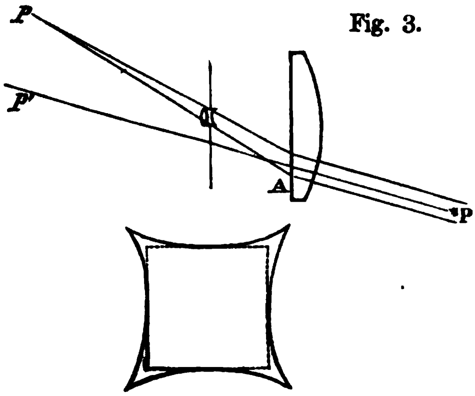
The extent to which this evil exists in the common view-lens depends upon its size, and the distance of the stop in front of it. The larger the lens, and the further the stop is from it, the greater the distortion, — and conversely.

In the orthoscopic lens there is distortion of the image from the following cause:—

An oblique pencil from an object P is incident at A on the front lens, and then, after suffering the deviation *p'*A*p*, passes through the concave lens at B without having its deviation counteracted, and comes to a focus at *p*.

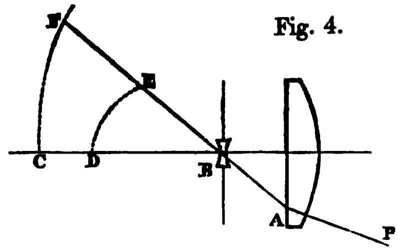
Here again there is deviation, and consequently distortion; but the deviation takes place from the axis of the lens, and therefore

Fig. 3.



the marginal objects of the picture are enlarged, and the images of straight lines curved *outwards* at the extremities, as shown in Fig. 4.

Fig. 4.

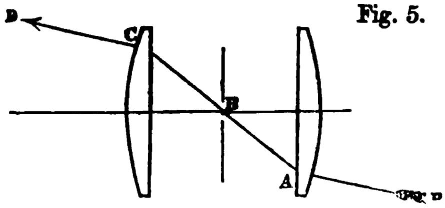


The distortion produced by the orthoscopic lens is different in character to that of the common view-lens, and also less in amount, because the front lens is smaller than the view-lens of equal focus, and the stop nearer to it.

Having shown therefore that the lenses in common use for taking views are *not* free from distortion, and having explained *why* they produce distortion, I will now pass on to certain combinations which are *totally* free from distortion.

If we take two convex lenses of any form, but equal in all respects, and place them as in Fig. 5, with their similar surfaces opposite to

Fig. 5.



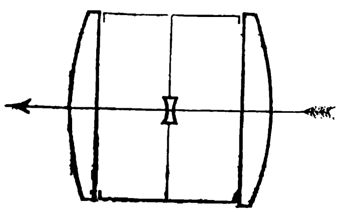
each other, and put a small stop exactly midway between them, it is obvious that all rays which pass through the centre of the stop will have

their directions at incidence and emergence parallel, as shown by the ray PACD in the figure, in which PA is parallel to CD. This then is a combination which totally cures distortion, because the axes of the oblique pencils suffer no deviation. But I find this combination useless when it is required to include an angular field of 40°, for the same reason that a small single lens was shown to be useless, viz. that the marginal pencils cannot be brought to good focus upon the focusing screen. The fact is, the curvature of the images produced by the front lens is very great, and the back lens exaggerates rather than corrects it. I have found that whenever convex lenses, either of equal or different focal lengths, are placed as in the figure, the curvature of the image produced by the combination is so great as to render it practically useless for views.

The combination shown in Fig. 5 is therefore useless as a view-lens.

The next step takes us at once to my new combination, which it is the object of this paper to describe. The plan is shown in Fig. 6.

Fig. 6.



Two common achromatic view-lenses, identical in all respects, are placed with their concave sides opposite to each other, and midway between them is placed a small double-concave lens of rock crystal, having surfaces of equal radius, and a small stop in contact with it in front. The distance between the convex lenses is not arbitrary, but depends upon the curvature of their concave surface, and is about the one-fifth part of their focal length; neither is the focal length of the concave lens arbitrary, but it may be stated as a little shorter than that of the convex lenses.

This combination is therefore symmetrical, and in consequence of its symmetry the oblique pencils emerge without suffering deviation, so that the image is totally free from distortion.

With respect to the definition of the marginal objects when an angle of 40° is included, and a reasonably small stop used, it is as good as in the best lenses now in use; and I find that owing to the low dispersive powers of rock crystal the introduction of the concave lens does not perceptibly affect the achromaticity of the combination; the visual and chemical foci still coincide.

The concave lens being nearly equal in focal length to the convex lenses, the focal length of the combination is very nearly the same as that of the back lens.

I will now show in what way the concave lens acts in annihilating the curvature of the image, since this is an important feature in the invention.

You are aware that in the orthoscopic lens the oblique pencils have their focal distance measured from the stop greater than that of the central pencil. Thus, in Fig. 4, if we suppose the dotted line DE to represent the curvature of the images of distant objects as given by the convex lens with a stop at B,—then, by introducing a concave lens at B, the focal distance BD is increased to BC, and BE to BF, in such a way that the oblique pencil suffers the greatest elongation of focus, and the field is greatly flattened, as shown by the dotted line CF. Now this flattening of the field by means of a concave lens may be carried much further by increasing the power of that lens, so that in my combination the image produced by the combination of the front and middle lenses becomes actually convex to the front lens. If we then introduce the back lens, which is convex, the conditions become those of a common view-lens with a stop in front, in which the central pencil has greater divergency than the oblique pencils, and therefore the convexity of the image is destroyed, and the field rendered perfectly flat; while in ordinary circumstances it is concave.

It would occupy too much time to discuss now the point relating to equality of illumination, but that is highly important, and I have gone fully into it in my pamphlet which will be published shortly.

My experiments have occupied much time, and have been made very carefully with the help of a powerful focusing magnifier, and I can speak with confidence of my results. With my combination of 8 in. focus and $\frac{1}{8}$ in. stop I have taken a circular picture 9 in. in diameter, with the lines of architecture absolutely straight, no concentration of light in the centre, and the definition good everywhere. Such an image has never before, I fancy, been seen upon a ground glass. With a $\frac{1}{4}$ inch stop about the same angular extent of field is included as with a common view-lens of the same focus and stop.

I hope at your next meeting to be able to show you one of my lenses mounted according to a plan which is now under consideration, and also some pictures taken with it.

In conclusion, I would observe that my lens

is, to the best of my knowledge, original. It is true that some years ago Mr. Scott Archers worked with a portrait-lens having a concave lens midway between the others, but that instrument has nothing to do with mine, nor did I take my idea from it. The main feature of my combination is its *symmetry*, without which there cannot be freedom from distortion, the evil which I have all along endeavoured to correct. So different, in fact, is Mr. Archer's plan from mine in *principle*, that if his is right mine is wrong; and conversely.

Having thus described my new lens, as well as I can in the compass of this paper, I refer you for further particulars to a pamphlet which will appear shortly. In the mean time I shall be very glad to hear any remarks and profit by any suggestions with which I may be favoured. I have great hopes that, with the valuable help of Mr. Ross, a fine instrument for taking architectural photographs, or for copying by photography, may shortly be introduced, and that photographers will never again have to endure with patience such criticism as that which I now quote from the *Literary Gazette* of a week or two since.

Speaking of Cameci's large views of Venice, now to be seen at the rooms of the Architectural Photographic Society, the writer says,—

"Occasionally there is traceable some effect of aberration or distortion, as in the upper lines of the loftier buildings, sufficient to show that the optician has not yet succeeded in constructing a lens that will perfectly render objects on so large a scale;" &c., &c., &c.

THOMAS SUTTON.

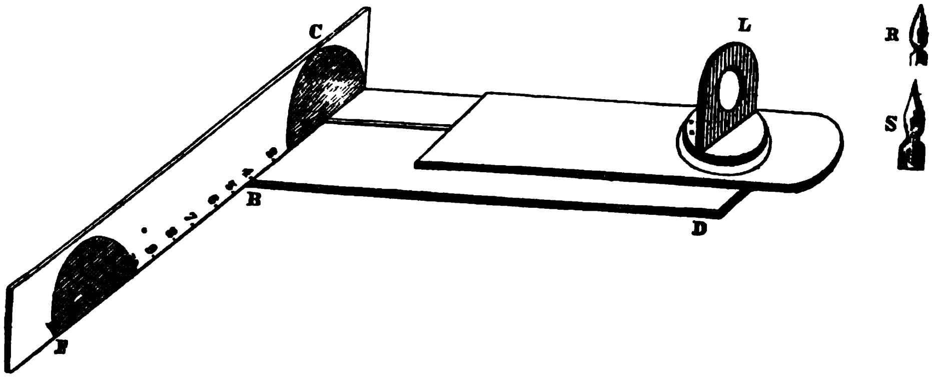
Cemented Achromatic Lenses.

To the Editor of the Photographic Journal.

Whitton, near Hounslow, Jan. 15, 1859.

SIR,—On a former occasion you favoured me with the insertion of some remarks on the Plano-convex and Meniscus lenses, I am not aware whether optical subjects have any interest for the general reader, but, should such be the case, some further observations may not be unacceptable. I inclose a small diagram of a little bit of apparatus that I have found convenient for observing the various phænomena connected with lenses, viz. the aberration for the direct pencil with the full aperture—the form and position of the coma, for every degree of obliquity—the position of the nucleus, or image, in relation to the centre of the shadow of the lens frame upon the focusing screen; this is indeed a measure of the distortion of a lens, since the image, by a single pin-hole or minute aperture, would certainly be in the middle of the shadow—the want of flatness and confusion of the image will also be easily observed. The diagram almost explains itself: it consists of three light boards, the lower one BD, having a dovetail groove along the centre, from end to end; the length may be eighteen inches, and breadth seven inches: upon this slides another board, four inches wide, carrying the lens frame L; this may be simply a shallow brass cap such as is used for telescopes; a circular piece of mahogany may be turned to fit into this, and the lens frame of metal is screwed to this, so that the lens can be rapidly moved on a vertical axis if required; the third piece of board FC, may be eighteen inches long and three inches wide, and screwed on the board BD, at right angles to its length; this board may be covered with clean white paper, and divided to inches commencing O, exactly over the groove; that therefore represents the centre of the focusing screen: the board BD might also be graduated to inches to read off the conjugate focus of the lens, when directed to a lamp, situated perhaps ten or more feet from the lens. The black patches C and F represent the shadow of the lens frame by the respective lamps S and R. Now if we place in succession a series of lenses, say cemented achromatics of the Meniscus plano-convex and double-convex sort, in the frame L, with the flint lens towards the lamp, and set the frame parallel to the screen FS, and focus by sliding the upper board backward or forward until the clearest image is obtained of the lamp, whose distance may be ten or more feet—the axis of the lens being directed to the lamp—we observe, first, that the image is surrounded by a loose fog proceeding from rays from the outside of the object-glass, having crossed the axis before it reaches the screen: this is an indication of positive aberration, the outside rays of the lens having come to a focus shorter than the central rays. Positive aberration seems an accompaniment of the whole class of Meniscus achromatic cemented lenses, and includes the plano-convex, and a part of the double-convex aplanatism, only occurring when the flint glass has become slightly convex on the outside, that to keep up the achromatism necessitates the crown being nearly plano-convex; it will be observed that what has been said refers to cases where the incident light impinges on the flint glass directly. After having obtained the best focus for the lamp situated directly opposite, we may just notice that the image is in the *centre of the shadow*, the frame being concentric with the lens. Let us now move the apparatus so as to bring the image near the end of the screen, as at F; we shall immediately perceive that the nucleus of

the cometic figure, viz. the image such as it is of the lamp, no longer remains in the *centre of the shadow*, but has moved towards the axis of the lens, by a very sensible quantity: this illustrates what we call the distortion of the lens, viz. the amount the image is displaced from the centre of the shadow. This distortion or compression of the images towards the



centre of the picture is an accompaniment of all the series of lenses we have named. We will now take the same lenses and place them in the reverse position, or with the crown towards the distant radiant. First as to aberration for the direct rays, those of the meniscus sort have all some slight aberration of the *positive* kind, but much less than they had in the former position. Passing to the plano-convex form, the aberration is nearly insensible, the form of the lens for aplanatism being one having its flint slightly convex on the outside. After this is past and we examine the more equally double-convex achromatics, the aberration again becomes evident, but not of the same character; for the central rays will now be found a little shorter than the pencils from the outside of the lens, and, if we push the lens a fraction of an inch nearer the focusing-board, there is a confused light with a clear image in the middle of it—in fact the "out of focus" image has a bright centre, and on pulling out the lens the central part of the spectra is darker than the margin: these are indications of *negative* aberration, and are sufficiently distinct from the former kind. We now turn the whole apparatus, so as to bring the image near F, at a distance from the centre of the screen: we shall there see a cometic figure, but with its nucleus on the side furthest from the axis; in fact the cometic image is reversed, the spur or tail being directed to the centre of the picture, while the image or nucleus is found to be gone out of the centre of the shadow on the side most remote from the axis. Thus the distortion is of a different character: straight lines would be convex to the centre; this, therefore, is an important difference to what was observed in the former position of the lenses. Now it might be inferred that, as the distortion is of a different character according to the side exposed, there might be found a form without any distortion; but in practice when we approach the aplanatic form and examine the oblique spectra, the nucleus appears to have blended into the figure—indeed we have little else than an oval of uniform light, without anything approaching an image; and hence, to get a picture without any trace of distortion, a combined set of lenses must be resorted to. I will not pursue the subject further in this place, but just observe that the perfection of images, the form and directions of the coma, and the form of the field or surface of images open a large field for inquiry. Theoretical developments based on the Snellian law of Refraction are certainly competent to enlighten us much; and it is with singular interest we look forward to the publication of the researches of Professor Petzval in the English language. The camera problem is a very intricate one, even if we look at it as realized by extended series of experiments; but when we are assured that it has been solved by a manœuvre of the calculus, or an application of mathematical means, we cannot but admire the skill and ingenuity and persevering labour that could alone have brought about so interesting a result.

With these remarks I will close, having run to a greater length than I had intended; and in a future number, if agreeable, I will give an extract from a table of the spherical aberration for a series of cemented lenses exposed to parallel rays. JAMES T. GODDARD.

REVIEW.

A Manual of Photographic Chemistry, including the Practice of the Collodion Process. By T. FREDERICK HARDWICH. Fifth Edition. John Churchill, New Burlington Street.

THIS Manual of Photographic Chemistry is

now so well known, that it will perhaps be more satisfactory, both to our readers and also to the author of the work, if we content ourselves with giving a sketch of the improvements in the volume before us. Those who already possess the fourth edition will thus be enabled to judge how far it will be worth their while to replace it on their shelves by this the fifth and last.

The preface commences as follows:—"The fourth edition of this work having been for some months out of print, the author avails himself of materials which he has collected at intervals during the past two years to enlarge it by nearly one-third. A careful revision was needed in every part; and many chapters which appeared out of date have been re-written.

"The most important improvement in the fifth edition of the 'Manual' will be found under the head of 'Chemistry of Collodion.' The author has manufactured large quantities of this material; and the opinions which he expresses have cost him the labour of many months. The preparation of a pure and unvarying ether, such as will stand the photographic test, is still a desideratum; but when once this has been attained, collodion will probably be a definite substance."

On turning to the chapters referred to, we find a variety of information, some of which being intended more particularly for the use of the manufacturers, is given in a type of smaller size. The principal point insisted on is a peculiar action of oil of vitriol in converting ligneous fibre into a material known as artificial or vegetable parchment, and which has lately become commercial in the hands of De la Rue and Co. This action invariably takes place to a greater or less extent in making pyroxyline; and the real secret of the manufacture, as the writer supposes, lies in exalting it to its maximum by diminishing the amount of nitric acid, and increasing that of the oil of vitriol and water. The film is then very tough, and possesses certain other qualities, both physical and chemical, which are found by experience to be most desirable for photographic purposes. This collodion is expected to supersede all other kinds made from linen, calico, or flax; but the use of cotton-wool in the process could never have been generally successful until the conditions necessary for removing the glutinosity and other defects which occur in pyroxyline made from that material had been pointed out. It has been stated, by no mean authority, that the use of paper is undoubtedly preferable to that of cotton; but from this work we gather that such an idea is erroneous, and that paper is very unfit for the purpose, since the composition of the rags is variable. The name of Dr. Norris is mentioned as having first suggested the use of weak acids, which is recognized as important; and directions are given to introduce into the fibre only the exact quantity of nitric acid which is required to confer solubility in ether and alcohol: anything beyond that will lessen the photographic value of the product. The advantages claimed for the particular form of collodion advised are these—fluidity, adhesiveness, facility of application to large surfaces of glass, stability both before and after iodizing, and considerable intensity of image. The pyroxyline is the most important ingredient in the collodion; but the purity of the ether is also of consequence, since collodion made from bad ether will deteriorate by keeping.

The same collodion may be made available both for positives and negatives, by simply changing the iodizing solution, and adding a bromide. It has been understood for some time past by makers of positive collodion, that the use of bromide is very advantageous in keeping the image upon the surface of the glass. Remarking upon the action of this salt, the author says—

"Does bromide increase or diminish the sensitiveness of the film to a weak light? This is a question which can only be answered by considering the chemical state of the collodion, bath, and developer. With pyrogallic acid as a developer and a dilute bath, bromide seems to *diminish* the sensitiveness considerably; but this appearance is delusive, since the latent image is really present, and simply requires a stronger reducing agent and more nitrate of silver to bring it out. On increasing the strength of the bath therefore, and using sulphate of iron as a developer, the whole of the details will show themselves after a minimum exposure in the camera.

"There are states of collodion also in which the use of bromide may *increase* the sensitiveness, viz. when decomposition has taken place. Every practical operator learns by experience that positive collodion containing bromide does not lose sensitiveness after iodizing, in the same rapid manner as negative collodion."

Two qualities of *bath* are spoken of for the positive process, differing in strength and acidity; the stronger bath is stated to produce the most sensitive plates, but with a greater liability to staining in development.

In the chapter on negatives in Part I., we find a considerable quantity of additional matter, relating to the influence which the strength of the light and the focal length of the lens have upon the quality of the pictures, with some remarks upon the use of bromide. Its real action in negative collodion is a diminu-

tion in rapidity and intensity of development, with a lessened tendency to solarization and excessive contrast. Speaking of field-work, "an experienced operator states that the bromide enables him to give an exposure sufficiently long for the landscape beneath without altogether losing the clouds above." The writer himself, however, believes that bromide may act differently according to the state of the pyroxyline in the collodion, and that there may be some conditions in which it will *increase* the intensity instead of diminishing it.

The question of cadmium collodion is discussed rather freely, both in the first and also in the practical divisions of the work, the conclusions arrived at being shortly these,—that it will never entirely supersede the old mode of iodizing, but that a good practical photographer may turn it to account in working in a bad light, or in dark glens and forest scenery, where the light comes down from above. For portraits, the collodion has the great merit of constancy in action; but to counterbalance this there are some defects. Perhaps the most desirable plan will be to employ the same plain collodion iodized sometimes with potassium and sometimes with cadmium; but the collodion must be prepared in a certain way to admit of this, since all samples are not suitable for iodizing with cadmium. Here again we quote the author's own words:

"The proper kind of pyroxyline is that prepared at a moderate temperature in weak acids, and sufficiently parchmentized by the oil of vitriol to give the requisite degree of toughness and fluidity. In dissolving the pyroxyline, it is best to use a large quantity of alcohol of sp. gravity 800, if it can be obtained. This will prevent too rapid setting, and so give time for the structural lines to coalesce and produce a smooth surface. If however the alcohol contains much water, the proportions of five of ether to three of spirit must not be exceeded. Collodion suitable for iodizing with iodide of cadmium can also be prepared from new linen; but the use of cotton-wool, although more difficult, is in other respects to be preferred."

The question of *alcoholic collodion,* which has been lately before the photographic public, receives due attention. An opinion is expressed that no rule should be implicitly followed, but a varied treatment given according to the nature of the pyroxyline. There are some kinds of pyroxyline which are very tough, and will bear a large quantity of alcohol; but in other cases the setting-properties would be weakened by an excess of alcohol, and the film in consequence would dry up at the top edge before the bottom part became sufficiently solid to bear the bath. Alcohol increases both sensitiveness and intensity, but only up to a certain point: if carried beyond that, it may diminish sensitiveness.

Three negative developers are recommended, viz. pyrogallic acid with acetic acid, pyrogallic acid with citric acid, and sulphate of iron. The properties of each require a careful study. The first is the form in most general use; but the second is a good developer for hot weather, whilst the third judiciously employed acts like a charm in removing many of those defects to which the negative is liable. The artist who aspires to real excellence in his productions will not allow himself to be biased in favour of any one formula, but will alter his reducing agent as the exigencies of the case require.

Before passing to photographic printing, we turn to the chapters on optics to seek for information on the subject of the Petzval lens. The distortions incidental to the use of the old form of view-lens are described, and a sectional diagram is given of the new construction. It is recommended for certain purposes on the authority of the late Mr. R. Howlett; but the amateur is cautioned against supposing that every lens sold by that name will necessarily prove satisfactory. The principle appears to be good; but the opticians sometimes fail in carrying it out practically.

Niepce's experiments on light are passed over in silence; but an apology is offered for the omission. In the preface we read:—"Those who are conversant with the proceedings of the French Society will expect to find a *résumé* of M. Niepce's researches on a new action of light; but the author, after a careful comparison of the results with those previously obtained by Moser and other experimenters, has decided to leave the subject for further investigation."

Photographic printing has not advanced during the last two years so rapidly as the negative and positive collodion processes, if we may judge from the improvements of this edition. The author's "researches" on printing, which in the 4th edition occupy some sixteen pages of small type, have been omitted in the present one; and in place thereof we have a sketch of the Cyanotype, Chrysotype, Uranium process, Bichromate of potash printing, Photo-galvanography, Photo-lithography, Photoglyphy, and Carbon printing process. On the future prospects of the latter the writer gives no opinion; neither do we find any special directions for carrying it out.

The practical details of photographic printing are enlarged,—toning by alkaline chloride of gold (see Photo. Journal, vol. v. p. 95), printing stereoscopic transparencies, vignetting, &c., being given in addition. We have

also some advice for varying the mode of printing according to the quality of the negative, and also for preparing an albuminized paper which will tone to a deep black colour. The preparation of the albuminized paper appears to be of more importance in the new plan of toning by alkaline chloride of gold than in the use of the old sulphuretting baths.

The preface states further,—"that the second part of the work, or that relating to practical photography, has been enriched by nearly one hundred pages of additional matter, for much of which the writer has to thank his friends, now comprising, he is glad to say, a large circle." The chapter on collodion and formulæ for solution appears to have undergone much alteration. The author evidently begins to distrust his science as far as relates to any previous analysis of the acids used in making the pyroxyline, for he says that experience has now taught him that nothing of the kind can be relied on, but that the properties of the pyroxyline, and of its solution in alcohol and ether, must be examined, which will be a guide in determining the proportions.

CHAPTER II.—'On Manipulations and Processes' receives a very careful treatment. There are seven distinct sections arranged as follows.

Section 1.—The Ordinary Manipulations of the Collodion Process.
Section 2.—Positive and Negative Portraiture.
Section 3.—Landscape Photography.
Section 4.—Copying Works of Art, &c.
Section 5.—Stereoscopic and Instantaneous Pictures.
Section 6.—Micro-Photography.
Section 7.—Photography in hot climates.

In the first section, the operator is supposed to employ a collodion prepared by the formula before alluded to. Every collodion has its characteristic defects, and warnings are given that straight lines taking the direction of the dip, and rivulets of liquid running down the plate, may occasionally be expected; these are dealt with by a lateral, or to-and-fro movement, and in extreme cases by dilution with absolute alcohol. Methylic alcohol is not recommended on account of its tendency to injure the bath; and on referring to the section in Part I., treating of the bath, we find organic impurities mentioned as the most important of all the conditions which interfere with success. "Nitrate of silver has an affinity for certain kinds of organic matter, and when such substances are present, the photographic action of the bath will be in some way interfered with."

Section 2, of the same chapter, contains the author's views on the subject of positive and negative portraiture, with the advantages, or the contrary, of working beneath glass. The experience of *positive* workers appears to show that a softer portrait may be made in a subdued light, and that in the case of pictures taken in the open air, the formulæ should be modified. Portrait *negatives* are often too intense in the high lights, and in consequence fail to print details of white drapery. This the writer attempted to remedy by making a pyroxyline less strongly parchmentized by the oil of vitriol; but although the results were remarkably good, the project was not altogether successful, since many mistook the nature of the collodion and used it to copy pictures, a purpose for which it was never intended. A modification of the developer is therefore preferable, and the operator may preserve the translucency in the high lights of the negative by working with sulphate of iron: if he does not succeed, it is probable that his bath is out of order, and he is advised to study what is said on the subject of bad nitrate of silver (see Phot. Journal, vol. v. p. 23).

The third section on landscape photography contains a list of apparatus and chemicals, with Mr. Levi's directions for making a tent; also various remarks upon diffused light and fogging, decomposition of the bath by agitation in travelling, proper state of collodion, &c. The iron salts as developers are again alluded to, but they do not invariably succeed in landscape photography, because when the plates are carried to a distance, a strong reducing agent, like sulphate of iron, is apt to produce a veil over the picture.

Section 4, on copying pictures, describes the extra precautions which are required in working on large plates, and at dimensions corresponding to the original. The author esteems it unsafe in such a case to take up any bottle of collodion and use it at a venture. There are some kinds, which no amount of keeping after iodizing, will bring into the proper state. When the camera-image is one of feeble illumination, the collodion ought to be in the best possible condition for giving an intense picture. The pyroxyline must be well parchmentized, and the proportion of alcohol increased as far as convenient.

Section 7, on photography in hot climates, contains many hints, the result of correspondence with friends who have left this country for India, &c. The question of collodion is the most important. How are we to make it so that it will stand the heat? The following extract is partly from the letter of a correspondent, and refers to collodion which has been exported to foreign climates:—"No two samples appear to arrive in the same condition, some being very limpid and others semi-gelatinous. Occasionally a white precipitate is seen in the

plain collodion; and when such is the case, the fluid becomes very brown on adding the iodizer, and no picture can be taken excepting by an exposure of almost impracticable length. The mode of proceeding adopted by the author has been to send out collodion of different qualities, and to compare together the reports forwarded to him of their general mode of working." The result of this experimental trial was, that perfect success could only be obtained with collodion made from a *tough* kind of pyroxyline, and iodized with iodide of cadmium.

The use of cadmium as an iodizer is undoubtedly indicated when the collodion has been changed by high temperature; and consequently the writer discusses one by one the difficulties which are likely to arise in iodizing by this mode, such as fogging and overaction of light, glutinizing at edges, &c. He lays some stress upon adapting the developer to the collodion, and mentions formula No. 2, viz. pyrogallic acid and citric acid, as very suitable for a cadmium collodion, when it gives red and thin negatives in a bright light. The use of absolute alcohol is also a great resource, and will enable the operator to coat glasses of a large size with comfort.

The dry-collodion processes are explained in Chap. V. of Part II. First we have their history sketched, commencing with the process of Messrs. Spiller and Crookes, and ending with that of Taupenot and Fothergill. Three are selected for more special consideration, viz. the oxymel, the Fothergill's, and the collodion-albumen process. Of these three, the author believes the last to be the most certain, but prefers the former as regards facility of manipulation. The quality of the negatives taken by means of oxymel is often remarkably good; and the collodion for dry processes, recommended in the work, is approved of by Mr. Llewelyn, as in every respect suitable. Fothergill's mode comes before us in the light of a new and comparatively untried process, but one full of promise. The theory is correct; and with a little attention to the state of the collodion, success seems nearly certain. The author takes the same formula of collodion as before advised for oxymel, and examines it in conjunction with Mr. Fothergill; but they do not at first meet with success. No image can be obtained on the newly-mixed collodion; and it appears necessary to keep it for a time in the iodized state. By introducing a modification in the mode of manipulating, this necessity, however, may be avoided. A final wash of very weak nitrate solution is applied, the excess being removed by water: this proceeding increases the intensity of the development. A plan of applying gallic acid to the surface is also spoken of as very effectual in remedying solarization.

Taupenot's process is given with the greatest minuteness; and a variety of manipulations are described, with an occasional apology for their apparent complexity. "The process is undoubtedly a troublesome one; but it is believed to be more certain than any other which has been published, and with ordinary care the number of absolute failures will not be very much greater than with wet collodion."

The list of "Imperfections in Collodion Positives and Negatives" has been much augmented in this edition; but it is not necessary to give examples: the practical operator will recognize his old enemies in many of the illustrations which are adduced, and will see that "spots upon the film" have sources more numerous by far than he could desire.

In connection with Part III., we notice only the introduction of fresh chemicals into the vocabulary, and more perfect directions for purifying. The best modes of dealing with waste solutions and residues are described in the Appendix.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF SCOTLAND.

The Third Annual Exhibition of the Society was opened towards the end of December in Mr. Hay's Fine Art Saloon, George Street, and has since continued to attract a large number of visitors. We may fairly congratulate the Society, not only on the admirable series of photographs which the Exhibition contains, but also upon the excellent accommodation which has been provided for their display; in this respect Mr. Hay's Saloon appears to us to be much superior to the rooms occupied by the Exhibition on previous occasions, and has doubtless in some measure contributed to the greatly-increased attendance observable this year.

Most of the old contributors appear to have sent specimens of their works; but there are a few whom we miss—Mayall, H. Taylor, White, Holden, and Ross and Thomson; on the other hand, the Exhibition is enriched with the productions of H. P. Robinson, Maxwell Lyte, W. T. Mabley, Melhuish, J. H. Morgan, Padre Secchi, Silvy, and an amateur W. D. C., all of whom we rather think contribute on this occasion for the first time, and many—indeed all—of them works of great excellence.

In reviewing an Exhibition numbering nearly 1000 pictures, it is impossible to do more than notice a comparatively small number of the leading works; and even of these some may have escaped our attention. As must almost necessarily happen, several of the pictures in the Scottish Exhibition are duplicates of those now hanging on the walls in Suffolk Street, while a few others are so well known, from having been recently exhibited by the leading London publishers, as not to require particular remark.

Prominent places in the Exhibition have been given to Caldesi and Montecchi's 'Beautiful Gate of the Temple' (No. 3), and 'Paul Preaching at Athens' (707), two of the reproductions by that Firm from the Cartoons at Hampton Court. No photographs better deserve their position, whether on account of the dexterous manipulation required in their production, or the admirable manner in which they convey the power and character of the original pictures. The Exhibition also contains the well-known photographs by the same Firm of 'The Princess Royal's Bridesmaids' (231), and 'The Royal Family at Osborne House' (428), both of which deservedly attract considerable attention. Cuccioni's large pictures 'A View on the Tiber' (25), and 'The Forum, Rome' (425) (the latter measuring 5 feet by 2 feet), have also had their great merits properly acknowledged by the Hanging Committee. The first, notwithstanding its modest title, is the best view of the Eternal City which has yet been published. It was kindly sent for exhibition by the great Bibliopole of Albemarle Street. Frith is represented by four of his large Egyptian pictures. Of these we prefer (6) 'The Hypethral Temple at Philæ,' and (7) 'Koûm Ombo' with its grand massive pillars. On previous occasions the magnificent remains of Nilotic architecture have been seen on the walls of our Exhibitions, but the size of Mr. Frith's pictures, irrespective of their admirable execution, lends a grandeur to his subjects in the present Exhibition which was previously wanting.

A series of photographs taken by Mr. Bedford, from the rich and picturesque ruins of Raglan, Chepstow, and Tintern. Of these we particularly admire his interiors, (14) 'Chepstow Castle—in the Chapel,' and (19) 'Tintern Abbey—the Nave,' which are admirable for their detail and a fine play of light and shade; one or two of his other pictures—(11) 'Raglan Castle,' (12) 'ditto—the Donjon,' though equally beautiful in detail, appear to us to be somewhat monotonous in tone. We should be glad if Mr. Bedford would on a future occasion send some of his charming 'bits' of English landscape, which we believe have not hitherto been exhibited in Edinburgh. Near Mr. Bedford's pictures is a small sheet of paper (No. 20) containing a series of eight photographs of the moon in its different phases, by Padre Secchi, of the utmost interest not only to photographers, but to all men of science. The original photographs are about 1¼ inch in diameter, and exhibit with wonderful minuteness and delicacy the peculiar features of our evening luminary. Immediately below them are two enlarged prints of the same, (21, 22), also of great interest.

Perhaps the gem of the whole Exhibition is (582) 'River Scene—France,' by C. Silvy. We have seen no photograph which has taken our fancy so much as that exhibited under this unpretending title, by Messrs. Murray and Heath. The natural beauty of the scene itself, rich in exquisite and varied detail, with the broad soft shadows stealing over the whole, produce a picture, which for calm inviting beauty we have not seen equalled. The works of M. Silvy have not hitherto been seen here, but we hope hereafter that we shall have many such in our Exhibitions. Mr. W. T. Mabley has sent several of his pleasing picturesque ivy-covered Somersetshire Halls and Abbeys, but we incline more to the soft beauty of his 'View on the Conway' (85), and the freer scope of (75) 'Llandudno,' a capital illustration of that fast rising watering-place. Mr. J. H. Morgan is also a large exhibitor; the whole of his pictures are meritorious, but there is a sameness about them which is not pleasing; if he would forsake the river-sides for a time, or visit them when the foliage is full, he would get rid of a certain coldness and deadness which materially detracts from otherwise excellent pictures. His 'View near Chagford' (58), 'The Woodland Stream' (687), and 'On the Teign' (770), are, however, very pleasing compositions, bright, and sharp in execution; and 710 is an admirable study of Beech Trees. Another patient worker by the river-sides, Mr. Mudd, sends some very forcible pictures from his favourite haunts. We prefer his 'Beavers' Pool, on the Sleder, North Wales,' (440), but 683 is also a very pleasing representation of a Mountain Stream, spanned by an old tumble-down bridge, though the running water is not quite successfully caught. A very large addition to the landscapes in the room is made by an amateur, W.D.C., who appears to be equally at home with several processes, and to get favourable results from all. His views in Edinburgh are particularly happy in point of selection, and in some, where the distant castle is introduced, he succeeds in securing an effect of distance which many photographers in vain attempt to attain. The Woodland scenes are also very good. Mr. A. Downie exhibits several excellent pictures: No. 733, 'Castle of St. Andrews,' is his most successful work, but in common with his others, it is much injured by the border of dark grey paper which he introduces immediately around the print. Fenton appears to be scarcely so well represented as we have seen him on previous occasions. There are, however, several of his admirable illustrations of Eastern life: 'The Reverie' (149), 'Turk and Arab' (386), and 'Pasha and Dancing Girl' (477), are all excellent in their way; while (128) 'Berwick,' a view from above the town, looking down upon it and the river, with the coast trending away in the far distance, is one of the best felt and most suggestive pictures in the room. The old-fashioned calotype process still finds favour with Mr. B. B. Turner, and if all could produce such results it would be a matter of regret that it had been so much superseded. (139) 'Scotch Firs', (371) 'Spanish Chestnuts,' and (385) 'Clump of Scotch Firs,' leave nothing to be desired. Mr. Thomas Davies exhibits a variety of his lane and pond scenes; some of these are exceedingly well chosen, but there is a hardness and spottiness about them which we do not like, and from which his earlier pictures were free. It seems to us to be a result of over-development in the negative. Among the other English contributors, Mr. Melhuish sends his large pictures of Greenwich (23 and 27), and several views of Lynmouth and the neighbourhood. We prefer his pictures of which we have given the numbers, and which are from collodion negatives. He does not appear to be quite so happy in his 'Lynmouth' (28), or 'Valley of the Lyn' (31), from wax paper; they are rather hard and wanting in gradation of tone. While, however, the wax-paper process does not appear to yield

very successful results in Mr. Melhuish's hands, its merits are admirably upheld in the present Exhibition by a large party of Edinburgh amateurs; indeed nearly the whole of the non-professional members of the Society, led off by their President, Mr. Horatio Ross, and Honorary Secretary, Mr. C. G. H. Kinnear, appear to have adopted this process, and contribute many excellent works. The President, however, does not confine himself to 'paper,' but has contributed largely from collodion negatives, and the Sporting pieces (and there are few who combine more happily the sportsman and the photographer) which he sends from his Highland home are probably his best works. 370 and 390, 'Studies of a Stag,' and some of his 'Forest Reminiscences,' 134 and 442, are capitally worked out,—while (486) 'Hurrah for the Highlands,' a party of gentlemen 'out' in the Forest; (675) 'A Young Deer Stalker; (698) 'An Italian Organ-man with Monkey,' equally attest his powers in portraying animal life in its highest stages. Nor should we omit to mention his 'Infantry in Square' (780) and 'Infantry in Column' (789), creditable alike to the skill of the photographer and the steadiness of the gallant Sussex Militia. Mr. Kinnear confines himself very much to architectural subjects. He contributes an extensive series of pictures from Elgin Cathedral, and several architectural views in Normandy and Oxford. Of his Elgin pictures (626), 'The interior of the Cathedral looking East,' pleases us most for the successful manner in which the various and rather straggling portions of the building are combined into an effective general view. We prefer, however, (712) 'Pluscardine Priory,' (778) 'On the Esk, Dalhousie' (this picture, though hung above the line, appears to us to be decidedly superior to the same subject (535, also by Mr. Kinnear) hung on the line, which is injured by an excessive radiation of light from the foliage), and (701) 'Ash Trees, Kinloch, Fifeshire'; the latter, in particular, being an admirable rendering of a very handsome group of trees in their full Midsummer foliage—a rather unusual subject for waxed paper, but in this instance most successfully treated. Probably the first place among the Edinburgh amateurs should be given to the Rev. T. Milville Raven, who has contributed a large number of pictures, principally views about Pau and among the Pyrenees. Until we saw these pictures we were not fully alive to the many excellencies of 'waxed paper,' but in his hands it appears to assert a superiority in many respects over any other process. In no other pictures do we see a similar softness of tone and truthfulness of atmospheric effect. Among his Pyrenean pictures we would particularly point out (216) 'Pierrefitte,' (214 and 218) 'Bagnères de Bigorre,' (242) 'Pau,' and (491) 'Cauterets.' Mr. Raven also sends a variety of other excellent pictures,—(244) 'View on the Rance,' (606) 'Old Bridge at Bétharram,' and (705) a most successful transcript of the highly ornamental façade of the 'Old Church of Notre Dame' at Poitiers. Mr. A. Y. Herries also deserves a very prominent place for his pictures of the interior of Roslin Chapel and New Abbey. Of the three views from Roslin, 162 seems to have some points of superiority; but they are all excellent, combining great boldness of effect with the nicest gradation of light and shade: any one who knows 'the dim religious light' which alone finds its way into the Chapel of the St. Clairs, will fully appreciate the difficulty of getting such pictures as these. Mr. Herries did not labour under the same disadvantages at New Abbey, but he has produced three capital transcripts from one of the most interesting old churches in the south of Scotland; he also exhibits several other pictures of great merit. Mr. A. F. Adam exhibits nine pictures taken by this process; 506 and 507, two views of 'Brunel's Suspension Bridge over the Tamar,' now in course of erection, show how useful an agent photography must soon become to the engineer, and that photographs of such subjects will soon supply the place of carefully-drawn plans. (703) 'New Abbey' is a most successful and charming picture of a difficult subject. Equally good are Nos. 694 and 734. No. 50, 'Raglan Castle from the Moat,' a clear bright sunny picture, with soft and broad shadows, is peculiarly pleasing. Mr. Ziegler has several pictures on the walls, and (171) 'Cottages at the Grange' is not exceeded by any picture in the room for depth of tone and brilliancy of effect. Among other successful wax-paper pictures by Members of the Society, we would point out (264) 'Culchuma near Coran Ferry,' by Dr. Duncan, and several works by Mr. Scott Elliot and Mr. Cunninghame. Mr. Walker and Mr. H. G. Watson, with their calotype pictures, run their wax-paper friends very close for honours: (381) 'Old Bridge, Dalhousie,' (531) 'On the Esk,' and (562) 'St. Bernard's Well,' by the former of these gentlemen, and (98) 'Dalhousie Castle,' and (517) 'Highland Cottage,' by the latter, are excellent both in point of subject and execution. Mr. Dallas has also some charming collodion albumen pictures; we admire more particularly (640 and 641) 'Scenes on the Evan.'

In endeavouring to do justice to the productions of the local photographers, we have nearly exhausted our space, and can only briefly refer to some of the other general pictures which we have not noticed, as we desire to reserve a few lines for the portrait-department of the Exhibition. De la Motte's remarkable picture of the Crystal Palace is so well known as to require no notice; and the same may almost be said of the contributions of Lyndon Smith and Maxwell Lyte. The former gentleman has sent eight or ten of his beautiful woodland and river scenes; one in particular, 'Rising Mist,' attracts marked attention; they are admirable photographs. Mr. Lyte contributes six of his Pyrenean pictures; they are all so good that we have difficulty in selecting any for particular commendation; perhaps the best are (965) the 'Pont d'Enfer at Eaux Chaudes' and (967) 'St. Béat'; if the aërial effect had been somewhat truer, these would have been perfect pictures. Mr. Church exhibits a large and interesting exterior view of 'Glasgow Cathedral' (230) (the only cathedral we think in Scotland not a ruin), and three equally excellent views of the interior, Nos. 382, 383, 384. The Exhibition also contains an extensive series of H. P. Robinson's studies and composition pictures. We must not omit to mention Mr. G. W. Wilson's pictures as worthy of all praise: nothing can be more effective than (664) 'Summer Morning on the Sands,' with

the quiet light stealing over the ocean and lighting up the sands in the foreground; it is an exquisite picture: and equally good, or nearly so, is (613) 'Ebb Tide, Morning,' with the waves rolling in at the end of the long wet beach. We should like to have alluded more particularly to the instantaneous pictures produced by Mr. Kibble's 'experimental dry process'—where he fixes on his plate as a motionless object the 'Express' steamer, speeding on her way at twenty miles an hour; but time does not admit of it. He states his exposure to be the *40th part of a second*, and the time of development 90 *hours*; and we believe that, when he has perfected his process a little more, he proposes to communicate it to the Scottish Society. We therefore conclude this part of our task by commending to special attention the admirable interiors contributed by Lady Matheson: for graceful pose and delicate execution (599) 'Portraits of two Young Ladies' is not surpassed by any professional work in the room; and (534) 'Portraits of Lord Campbell and Family' is in no way inferior to it.

In portraiture this Exhibition has some fine specimens, both plain and coloured. We regret, however, to see many pictures so highly painted as to obliterate all traces of the photograph, and can hardly see how a photograph when thus treated is admissible in a Photographic Exhibition. We would mention as examples of such pictures 881, 882, and 883, by A. Claudet; as also 885, by J. Moffat. We are the more inclined to look with disfavour on these pictures, as the artists of them show in their untouched pictures that they are fully able to produce pleasing and good effects without the brush. Mr. Moffat has made rapid strides in photography since the last Exhibition, and has some excellent portraits of Edinburgh worthies. Miss Taylor has a lighter hand and touch, and more skilfully applies the brush, while she retains much of the charm and truthfulness of the photograph. Nos. 882, 825, and 837 are good specimens of her skill, and stamp her as an artist of great merit and promise.

Maull and Polyblank are represented by a large number of good pictures. The portraits of Mr. Roebuck, Dr. Livingstone, Mr. Gladstone, and Lord Aberdeen are excellent. They are most happy and successful, perhaps, in their portraits of ladies, of which they have several specimens, which are most graceful and beautiful examples of their consummate skill. The same may be said of Mr. Rodger; he is second to no photographic artist, with whose works we are acquainted; among his best pictures may be mentioned Nos. 667 and 627, 'Portraits of Ladies,' as perfect specimens of photographic art. Mr. Wilson of Aberdeen is also a most successful manipulator; and his portraits are peculiar for their grace and beauty of form and attitude. Nos. 863 and 862, the former a 'Portrait of a Boy,' and the latter of a 'Lady,' are most pleasing and charming pictures.

M. Tunny is represented by nine admirable portraits. Those especially deserving of note are Nos. 399 'Rev. Dr. R. Lee,' 397 'A Lady,' and 401 'Mr. Hope.'

Mr. Henderson's and Mr. Davidson's works are hard and disagreeable. Mr. Barnes has some very pleasing pictures, among which 676 and 681 may be mentioned as equal in point of merit to any portraits in the Exhibition. Mr. McGregor sends but few portraits; but they are all of them good: (No. 109) 'Mr. Carrick,' and (No. 288) 'An Old Gentleman,' and (No. 600) the 'Rev. T. M. Raven,' may be mentioned as among his best works. Messrs. G. and D. Hay contribute a large number of very charming glass positives; by skilful manipulation they overcome all the disagreeable appearance which such portraits generally have, while their high finish and great softness and delicacy recommend them to all lovers of fine art. Messrs. Truefitt, Brothers, exhibit several collodion positives; but they are hardly equal to their other works. A small frame, however, of coloured glass positives may be an exception; but being merely copies of chalk-drawings, they lose much of their value and interest. We must not omit to mention the three life-sized portraits (941, 942, 943) by Mr. Ramage. These pictures are enlarged from small negatives, and are printed on common iodized calotype paper, simultaneously with being enlarged. The resulting pictures are striking in size, and are commendable as being entirely free from the distortion usually observable in so large portraits; they have much of the effect of good lithographs. No. 942, 'The Very Rev. Principal Lee,' is especially praiseworthy.

The Stereographs of Messrs. Ogle and Edge, as also those of Mr. Wilson of Aberdeen, are most beautiful specimens of what wet collodion alone can produce. The latter gentlemen has visited Staffa and Iona with his camera, and contributes a number of valuable and interesting views from these places. Messrs. Ogle and Edge have also been happy in the selection of their subjects.

Mr. Fox Talbot contributes nine photoglyphs, which will stand minute examination, and are remarkable for their softness and delicacy of tone: the deep shadows require a little more detail; but this is probably owing to some defects in the photographs from which they have been copied.

Mr. Talbot supplies us at least with a permanent printing process, and one easy to manipulate, and certain in its results, while it promises to introduce a new era into steel and copper engraving. Some process by which photography could be applied to the illustration of books, &c. has long been a desideratum; but the difficulties which stood in the way of its general application have been so great as to prevent its use for such purposes. The photoglyphic process, however, seems to overcome all difficulties and to ensure a cheap and easy method by which books may be illustrated to any extent.

There are several other artists of merit, amateurs as well as professional, whose pictures we fear we may have passed over, not from any want of appreciating their beauties, but from our inability to mention more than the few pictures which the limited space of our Journal permits us to do.

The Edinburgh press have, with their accustomed ability, written several articles on this Exhibition, in which honourable mention has been made, not only of all those pictures to which we have drawn attention, but to many more; and we regret that space and time will not allow us to do the same.

NOTTINGHAM PHOTOGRAPHIC EXHIBITION.

[Concluded from page 161.]

"Among the beautiful landscapes, which adorn the room, 'Home, sweet home' is a charming production, thoroughly poetical, and English in character. A river, some foliage, a solitary cottage in the distance, constitute the materials of the composition. Mr. Rejlander might have set his camera only a few yards off the point of view from which this picture was taken, and have spoilt it; the bit of bank in the foreground is just right. Mr. Sidebotham's small picture of a 'Bridge near Staines' is another of the gems, which for delicacy of tone and effect it would be difficult to surpass. Thurston Thompson's studies of trees and lane scenery are very excellent, and well adapted for the artist's studio.

"Fenton's landscapes and Le Gray's sea pieces, with clouds, taken instantaneously, are very beautiful, and display careful selection of the point of view. The two views of Rouen, by the late Robert Howlett, and taken with the new orthographic lens, are perfect. There are also some excellent views by the Rev. J. J. Dredge. Mr. Bourne's 'Nottingham Castle,' 'Audlem Church,' 'Newstead Abbey,' and 'The Wheat Field,' we believe to be among the best which he has exhibited. Dr. Goode, of Derby, and Miss Hurst, of Alderwasley, exhibit some good landscapes. 'The Doorway at Dunstable Church,' by Nowall; 'Rocks at Cowden Knowes,' by Cotesworth; and the works of Archibald Briggs, Alfred Rosling, the Rev. J. Holden, and Mr. Smith, are remarkable for their beauty, especially some which are done by the calotype process. Frith's illustrations of Egypt and Palestine, exhibited by the Nottingham Photographic Society, and a large collection of framed photographs contributed through the School of Art, by the Science and Art Department, are an evidence of the instructional value of the art; and the photographs of 'The Moon,' by Father Secchi, Nasmyth, and E. Sidebotham, of its application to science.

"Among the contributors we have observed the names of Henry Walter, Esq., Charles Paget, Esq., M.P., the Right Hon. Lord Belper, the Rev. R. Miles, C. P. Clifford, &c.

"The Nottingham Photographic Society has been presented with four beautiful landscapes, by Mr. Alfred Rosling, of Reigate; three landscapes, by Mr. Sidebotham, of Manchester; and the picture in the Exhibition, 'Fading Away,' by Mr. Henry P. Robinson, of Leamington."—Abridged from the *Nottingham Review*, Jan. 14, 1859.

Description of Mr. Burnett's Pictures in the Photographic Exhibition, Suffolk Street.

I. Scraps accompanying British Association Paper of 1855. Papers prepared with ferridcyanide of potassium:—1, development by salt of cobalt; 2, development by salt of uranium.

II. From British Association of 1855, and Scottish Society's Meeting. Ferns printed directly from nature by superposition. Paper prepared with a salt of uranic oxide (tartrate); development by ferrocyanide of potassium (*yellow* prussiate of potash); fixing by plain water; a *positive direct* printing process.

III. From British Association, 1855; Glasgow Exhibition, 1855; and Scottish Exhibition, 1856–57. Paper prepared by a salt of uranic oxide (hydrofluate); development by a solution of ferridcyanide of potassium (*red* prussiate of potash); fixing by plain water; a *negative* printing process (from glass negative by Ross and Thomson), discovered again a few weeks ago by M. N. de St. Victor.

IV. Three Scraps illustrating three of the uranic development processes; all from British Association of 1855; Glasgow Exhibition of 1855, and Scottish Society's Exhibition of 1856–57. 1. The positive development by yellow prussiate of potash; 2, the negative development by red prussiate; and 3, the negative development by nitrate of silver, *re*discovered by M. Nièpce de St. Victor in 1858. This last specimen also shows on the back the impression of the newspaper with which it had been left in contact in the pressure-frame. M. Nièpce, however, introduced two improvements: the first being the fixing by water alone,—an absurdity; and the second being the use of an acidulated silver developing bath,—no real improvement. Mr. Burnett employs a neutral or alkaline developing bath, much more rapid in action, especially the latter, and fixes by hyposulphite or *by weak ammonia water*, transferring from the developing bath, in the first instance to a *weak* solution of acetic acid, ammonia, or pure water, to remove uranic oxide, silver, &c. He tones (before and after fixing) by alkaline, neutral, or acid gold solution, or platinum or palladium salts, and also frequently calls in the aid of ferrous salts.

V. From Scottish Society's Exhibition of 1856–57. View on the Dee from negative by Wilson: same process as last, but gold-toned, &c.

VI. Four Scraps from Scottish Society's Meetings, illustrating—1, uranic nitrate paper silver-developed, ammoniochloride-of-gold-toned, and ammonia-fixed; 2, ditto, but platinum-toned; 3, ditto, but untoned; 4, ferric nitrate albuminized paper silver-developed and platinum-toned—all four being ammonia-fixed.

VII. From Scottish Society's Exhibition of 1857–58. Same process as No. III., only with the addition of an iron toning bath.

VIII. Same process as No. VII., from same Exhibition.

IX. Uranic silver print (probably platinum-toned).

X. Four prints on unalbuminized nitrate of uranium paper, showing — 1, development by palladium-nitrate (or ammonio-nitrate may also be employed with or without iron-baths. This palladium development has not *yet*, as far as Mr. Burnett is aware, been included in the re-discoveries of M. N. De St. Victor); 2, development by ammonia-nitrate of silver with transference (with intermediate weak acetic bath) to acetically acidulated sulphate-of-iron bath, fixed by hyposulphite (or ammonia-water); 3, development by nitrate of silver with transference to iron-bath, fixing first by weak acetic-acid bath, then by washing in weak ammonia-water; 4, same process as 3.

XI. From Scottish Society's Exhibition of 1857-58. Cuprotype or copper-printing process on paper prepared with copper-sulphate and potash-bichromate.—See Scottish Society's Report of Mr. Burnett's remarks, and Letter to Editor in Journal of the Photographic Society, of August 1857, and fuller report of same remarks in Journal of November or December. The best specimen produced was sent to the London Society along with the letter in August Journal. This process is especially recommended for photography on textile fabrics, and for burning into tiles, &c.

XII. Same process as No. XI., but on paper prepared by pure bichromate of copper.

XIII. Fern-leaf, from a superposition-negative: paper prepared with mixed potash-bichromate and manganese-sulphate; fixed by water. A slight improvement on Mr. Ponton's old process; recommended for leaf-printing and for photography on textile fabrics, for which it appears to have some advantages.

XIV. 1. Fern-leaf, printed on paper prepared with solution of nitroprusside of potassium. 3. Scrap on paper prepared with mixture of nitroprusside of potassium, with large excess of ammonio-oxalate of ferric oxide,—the colouring matter being prussian-blue, mixed with yellow nitroprussiate of ferrous oxide. 2. Same as 3, with the blue removed by an alkaline bath. The blue and the yellow give together an analysis of what goes to make the green in the other specimen.

On a Dilute Albumen Preservative Process.

To the Editor of the Photographic Journal.

Belsize, Hampstead.
Jan. 3, 1859.

This process may be considered as a modification of Fothergill's, the collodionized plate on its removal from the nitrate bath being simply washed with *very dilute* albumen, and afterwards with water.

Albumen, to each ounce of which 3 minims of liquid ammonia and its own bulk of water are added, is beaten up in the usual way, allowed to settle, and filtered through sponge; it may be preserved in a stoppered bottle with camphor: for use, 1 ounce is diluted with water to make up 20 oz.

The success of this process appears to depend in a great measure on the proper degree of dilution of the albumen. The above succeeds very well; a stronger solution seems to cause markings on the plate like those on watered silk, in consequence of too rapid coagulation: for if nitrate of silver be added to a concentrated solution of albumen, a dense precipitate is rapidly formed; but if the albumen be much diluted, a precipitate is produced only after the lapse of some time, and in a finely-divided state: this is the condition suitable for this process. The manipulation for stereoscopic plates is as follows:—On removing the plate from the nitrate bath, let it drain for half a minute, and wipe the back with blotting paper, the lower edge resting on a small pad of the same material; then place it face upwards in a bath, having a well at one end, into which has been previously poured about 2 oz. of the dilute albumen; lower the bath rapidly, so that a wave of the fluid may flow quickly over the surface of the plate; keep it flowing backwards and forwards for about two minutes, or until the albumen, which at first was clear, has become quite milky, and does not appear to get more so; pour it off, and supply its place with water and agitate. The plate is now removed by means of a hook, and *well washed* under a tap, and finally rinsed with distilled water. It may be set aside to dry, or may be dried rapidly before a red fire or over a spirit lamp.

The plates thus prepared are very sensitive, 30 seconds to $1\frac{1}{2}$ minute being sufficient to print a transparent positive by means of an argand gas-light,—plates preserved by the gelatine processes requiring from 6 to 8 times as long with the same negative and burner. An exposure of 4 minutes, with lens of 5-inch focus and $\frac{5}{8}$ stop, at 3 o'clock on one of the late very dull afternoons, of a subject containing dark masses of trees and stumps, &c., proved sufficient for the most minute detail in the dark parts. The collodion should be one that adheres firmly to the glass, although the tendency to separate is not so great in this as in the gelatine processes.

The developer is $1\frac{1}{2}$ grain pyrogallic acid and $\frac{3}{4}$ citric acid to the ounce, no alcohol or acetic acid; the plates should be levelled and well washed with two waters, and drained before pouring on the developer; 3 drops of a pure

30-grain solution of nitrate of silver should be added to about 2 drachms of pyrogallic solution and mixed, before using; when the picture has appeared in *all* its details (which takes considerably longer than with wet collodion), more nitrate (5 or 6 drops) may be added to blacken it, pouring off and well mixing. If the first developer becomes much decomposed, a fresh quantity should be mixed, using 6 to 8 drops or more nitrate until sufficient intensity is obtained.

It will be found (contrary to the usual instructions) that the picture will develope cleaner and darker, and the pyrogallic solution become less discoloured, if it be allowed to remain at *perfect rest* on the levelling stand after the first wave backwards and forwards to spread the solution, motion appearing to cause the precipitate to form in the solution instead of on the surface of the exposed parts.

Fix with cyanide, as it requires less final washing than hypo.

F. Giesler Lloyd.

Reply to a "Member," on the Chemistry of the "Fothergill Process," and to "W. L.," explaining the cause of, and how to avoid, Cracks in Film.

To the Editor of the Photographic Journal.

Leamington, Jan. 17, 1859.

Sir,—A "Member"—Journal Dec. 21st—in taking exception to my experiments illustrating chemical changes that take place in the "Fothergill Process," because I did not operate with *pure albumen*, and considering *that the chloride of sodium in the white of egg fully accounts for all the reactions I observed and recorded*, has not only departed from the subject which my communication was intended to explain, viz. "Chemistry of the Fothergill Process," so far as it relates to preservative agent (white of egg or albumen, *not pure* albumen), but has not read, or omitted to notice, the most important part of it: for at p. 77, line 6 from top and following (Journal Nov. 22), he will find reactions mentioned that *certainly could not be produced by chloride of silver*. I must confess the oxide of silver test as illustrating the formation of "albuminate of silver," *appears* open to this objection; but there is a distinctive difference between the opacity produced by albumen and chloride of sodium,—the former giving the characteristic *milky-white* precipitate of its combinations with silver, and the latter white, with a bluish tendency by transmitted light.

From your correspondent's communication, it would be inferred I had advanced that the compound formed in this process was "albuminate of silver," whereas in my letter it is stated, I consider that term a misnomer, and the compound to be one of albumen with the silver salt, and not the base. I think, in the face of facts mentioned, and your correspondent's expressed belief in the existence of such a salt as "albuminate of silver," we were entitled to some *reasons* for his supposing that the *albumen itself* does not play any other part than merely a convenient vehicle for the chloride of sodium, more particularly as in that case it would not possess any advantage over gelatine, which also contains that salt, or a solution of gum-arabic with chloride of sodium added to it.

In a following Number (Jan. 6th), a correspondent (W. S.) complains, as the most serious objection to the "Fothergill Process," of the film peeling off on drying after fixing the negatives; it is with much pleasure I am able to inform your correspondent that the process, when properly carried on, so far from being open to this objection, gives a film so firm that negatives have been printed from without being varnished. The objection, however, is liable to occur if a much larger quantity of water than recommended in my instructions be used for washing the sensitized plate, as the solution of silver in porous cells of collodion becomes too dilute to form a good coagulum with the albumen. The use of cyanide or a *strong* solution of hypo for fixing plates greasy or not roughed at the edges, or albumen not carried well up to edge of plate, are all enemies to a firm film; in fact cyanide, as has been frequently stated, should never be used for fixing albumen pictures. If "W. L." will attend to these particulars, I feel satisfied he will not have to complain of want of strength of film.

Alfred Keene.

RECEIVED.

The Photographic Art Annual, illustrated. Folio. William Lay, 1859.

We have received communications from Mr. Burnett, Mr. Maxwell Lyte, Mr. Egbert Moxham, and other valued correspondents, which, together with replies to several of our inquiring friends, must be allowed to remain for our next Number on the 21st inst.

Letters of inquiry to the Editor can only be answered through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers, Messrs. Taylor and Francis, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 79. FEBRUARY 22, 1859.

Lovers of the photographic art who may reside at a distance from London may be usefully warned that the Exhibition of Works now on view in the Suffolk Street Gallery, will close for the season in the first week in March.

This Exhibition, our friends will be pleased to hear, has been in a pecuniary sense—perhaps also as regards public appreciation of our scientific labours, and general service to the world of artistic students—the most successful which the Society has yet held. This is very encouraging. The Prince Consort, our august patron, has made a minute and very satisfactory inspection of our selected treasures. Her Majesty has been graciously pleased to express her interest in the Exhibition, and to permit us to hope she may pay us a visit before we close our doors. Many of our fellow-labourers in the cause who may not have yet honoured us with a call at Suffolk Street will, we trust, seize the opportunity, before it is too late, of comparing notes on the progress we may have made from year to year.

A most popular and attractive series of new pictures has been added to the Gallery since we last met. These comprise some six-and-twenty illustrations of the great and beautiful city of Lucknow, the chief locality of the Eastern war. Besides portraits of a phalanx of Indian heroes, Lord Clyde, Napier, Birch, Greathed, and many others known to fame, the views of public buildings and localities in the city connected for ever with the chivalry of Havelock, and the successes of Outram and Clyde, are most striking and memorable. We may specially indicate:—

Panoramic View of Kaiser Bagh, showing about half the palace,—a panorama taken from the northern minaret of Ashruf or Dowlah's Mosque, showing Stone Bridge, Fort Napier, Mosque Mutchee Bhoroun, &c., Residency, Chutter Munzil, Sunnder Bagh, Kudum Russorl, Martinière, Dilkooshah, Moogul Bagh, &c., in extreme distance; La Martinière; the Mosque of Ashrufoodowlah, Emāmbāra Square, taken in April 1858; Napier's Mosque on Lutchmun Tealah, fortified by British, April 1858; the Chutter Munzil Palace from the River; the Pavilion in Kaiser Bagh occupied by officers of 23rd Fusileers; the Mutchee Bhwan from head of Stone Bridge, demolition in foreground carried out by British for defensive purposes, April 1857; the Residency, April 1858; Baillie Guard Gate from outside, on right of which is the entrance through which Havelock's force entered the Residency Sept. 25th, 1857; the Baillie Guard Gate of the Residency from inside, Captain Bazaar and Clock Tower Gate on left, Tombs of Saadat Ali Khan and his wife in front, Cawnpore Road (right front) by which Havelock's force arrived, and entered the Residency where the horse stands, gate being barricaded, April 1858; the Great Emāmbāra of Ashrufoodowlah, 300 feet long, main nave 54 feet wide, side aisles 27 feet, carved arched roof; and "Singulis in Orbe," Royal Zenana boat, guardship sunk at her moorings, on left Chutter Munzil, Furād Buksh, River, Dil Arām or Heartsease, the first day's march of royalty from Chutter Munzil.

These admirable views give us, in fact, the pictorial romance of this terrible war. They are necessary, as our contemporaries say, to an understanding of the war now, and will be indispensable to its future historians.

Some of our friends, as we find from those free criticisms on the Exhibitions which we earnestly seek for our own guidance, entertain a fear lest the printing of prices in our Catalogue may lead to some unexpected abuses.

We are obliged for the hint, and shall watch the experiment with the greatest care. If we see reason to suspect the abuse which some of our friendly correspondents dread, we shall very seriously reconsider the reasons which have induced us to test by experiment a plan urged upon us by many who labour earnestly in the cause. We may, however, at once disabuse some of our critics of a fundamental error which appears to exist in their minds. The Society has no interest in the matter. Prices are affixed to works in the Catalogue solely for the convenience of the public, and in the interest of the artist. In adopting this course, the Council of the Society had the example before them of every artistic society in England. All the picture exhibitions, from the Royal Academy to the Female Artists' Society, make known the prices of the works exhibited. Some do so, like the Academy, by a list in a side room; others, like the French Exhibition, by means of a card on the table; still more, as the National Institution and the New Water Colours, by plain figures of pounds, shillings, and pence in their Catalogues. Thus the Photographic Society only follows established forms. There may be solid argument against our course; but it is not, at all events, the argument of novelty or innovation. In this, as in every other branch of their administration, the Council are the servants of their colleagues and fellow-labourers; they are not wedded to this rule of publishing prices in the Catalogue beyond the reach of sound reason.

A local Photographic Society has been established at Ryde, in the Isle of Wight, as a branch of the Philosophical and Scientific Society of that island. Mr. Joseph Paul has taken up the duties of Honorary Secretary to this new section. We wish our insular friends every success. A more beautiful and attractive field of operations nowhere exists in these kingdoms—perhaps not in Europe.

We have received a communication from the Council of the Royal Astronomical Society, asking our aid in collecting memorials of Donati's comet. No doubt many such are scattered in negatives about the country. We take the liberty, therefore, of entreating any of our friends who may have made photographic studies of the various phases under which our late celestial visitor was visible to them, to communicate with the Secretary of the Astronomical Society.

In happy connexion with the service which is now demanded at our hands in the name of the most august of all the sciences, we beg again to draw the attention of our readers to the success of Mr. Warren De la Rue in taking a stereoscopic view of the moon's disk. This success is so complete as to strike the reader like a miracle. Here is our poetical neighbour, with every ridge, seam, volcanic waste, and mountainous ruin, brought close to the eye, as the globe of a moderator-lamp. The roundness of the face is perfect. A rustic looking at Mr. De la Rue's moon would be convinced that it is not a slice of cheese; but the poet might very well imagine it a heavenly light. We have seen no map of the lunar surface to compare in fidelity to this beautiful work of art.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

Ordinary Meeting.

February 8, 1859.

Horatio Ross, Esq., V.P., in the Chair.

The minutes of the preceding Meeting were read and approved.

The following gentlemen were balloted for and elected members of the Society:—Mr. Henry Smith, photographer; Mr. G. Ramsay Wilson; Mr. T. Sprott, W.S.; Mr. A. B. Shand, advocate; Mr. G. W. Wilson, photographer; Sir W. Keith Murray, Bart.

There were sent for exhibition, by Mr. Blair of Perth, specimens of his carbon-printing process, as described in the 'Photographic Notes' of February 1st; and by Mr. Zambra, George Street, specimens of photographs on enamelled glass, stated to be by a new process.

The Chairman then proceeded to announce the result of the competition for the Society's medals for the two best pictures in the present Exhibition. He said: It is now my pleasing duty to announce that the medal open to competition amongst members of this Society only,

has been gained by the Rev. T. M. Raven, for the picture, No. 216, 'Pierrefitte, Pyrenees*;' and that the medal open to competition amongst photographers generally has been gained by Mr. Lyndon Smith, for his picture, No. 416, 'The Rising Mist.' I may at the same time congratulate these gentlemen upon the circumstance that the votes of the members have awarded the medals to them by a very great majority; in fact it is almost the unanimous opinion of the Society, as expressed by these votes, that the picture by Mr. Raven, and the picture by Mr. Smith are, of those in competition, the best in the Exhibition. The medals have been most worthily gained, but, I think, especially so in the case of our friend Mr. Raven, who has followed his pursuit in foreign lands, under circumstances doubtless of a very discouraging kind, as any one who has been placed in similar circumstances is prepared to testify. I have been abroad myself; and the *endless annoyances* to which I was subjected were such as almost caused me to declare I would never again take my camera to the Continent.

I could have wished that we had had a *third* medal to bestow. This would doubtless have been awarded to Mr. Kibble. In passing, I may state that I gave one of my votes to Mr. Raven and the other to Mr. Kibble. This gentleman's picture of the 'Express Steamer' is one of the most wonderful pictures ever produced. Here you have a steamer going at the rate of twenty miles an hour; and yet so rapid is the execution (although taken with a single lens and a dry plate), that there is not a single rope out of place. Mr. Kibble has promised to communicate to the Society the process by which his wonderful instantaneous pictures are taken; and when he does so, we shall all be under a deep debt of gratitude to him, and perhaps the nature of his communication may be such as to warrant us in assigning him a place in the immediate vicinity of Nièpce, Daguerre, and Talbot, our early photographic fathers.

In this award of the medals, many of course feel disappointed; for it is one of the charms of our art, that each one thinks his own pictures the best. But it must be borne in mind that, however many horses start in a race, one only can gain the prize. We, the beaten horses (for I myself am one of them), must just endeavour to do better next time.

Mr. Duncan, advocate, then read a paper "On the Law of Copyright, as applied to Photographic Works."

At the conclusion of the paper, the Chairman, in conferring on Mr. Duncan the thanks of the Society, said—"The subject of copyright is one of deep importance to every member of the photographic body. From the very able paper read to-night, I gather that in point of fact we are totally unprotected by any law of copyright. In consequence of the number of complaints of the piracy of photographic works, I wrote last year to Lord Elcho, to see if he would bring a bill on the subject before Parliament. This he promised to do if a bill was prepared by our Society. I therefore hope that advantage may be taken of this opportunity to have the law of copyright, as affecting works of photography, put on a more satisfactory footing than it is at present."

* Now Exhibited in Suffolk Street.

The Society then adjourned.

On the Law of Copyright, as applied to Photographic Works. By Mr. J. M. Duncan, Advocate, Edinburgh.

The subject of the present paper is not only one of great interest, arising from the wide and ever-extending application of Photography to artistic and other purposes, but it is also a subject of considerable difficulty, arising mainly from the circumstance that, while Photography had been introduced, and was being practised to a considerable extent, prior to the date (1852) of the 15 & 16 Vict. cap. 12 (which, among other purposes, was passed expressly with the view of removing doubts in regard to the extent to which the provisions of two previous Acts, conferring copyright in engravings and prints, applied), no especial mention of photographic pictures or prints is made in that statute. To this element of difficulty another may be added, which is, that while Photography does unquestionably and in an eminent degree embrace one of the grand characteristics of those processes to which it was the aim of the statute to extend the privilege of copyright, viz. that of self-multiplication or reproduction, this result the art of sun-painting achieves by a different, and in many respects a much less laborious, *modus operandi* than the tedious, expensive, and difficult manipulatory process of engraving or etching on steel or copper plates.

The limits of a paper read to this Society are such as to exclude the possibility, on my part, of fully explaining, far less exhausting the topic in hand. My purpose will be attained if I succeed in explaining to you such of the leading principles of the law of copyright as will enable me to apply these principles to the rights of authors and owners of photographic subjects—I do not say successfully, but in such an intelligible manner as will enable you to judge of my success or failure in this respect, for yourselves.

The law of Copyright holds, with respect to literary productions, very much the same place as the law of Patent does with respect to material inventions. Both are expedients to which the wise and enlightened policy of law has had recourse to secure, in a more effectual manner than otherwise it would have been possible to do, the fruits of their skill, genius, and taste to the inventor, the scholar, and the artist—to reward

> "The keen invention of some vigorous mind
> Which gleaned from Science gifts for all mankind."

Without attempting a formal definition of "Copyright," I may describe it as an exclusive right of reproducing an original literary work or work of art, conferred by law on, or extended to, the author of that work for a given period after the date of its publication. I use the phrase, 'after the date of its publication,' advisedly, because before that date the right of an author to multiply copies of his work does not, properly speaking, partake of the character of a privilege—which copyright unquestionably implies—but is nothing else than the exercise of the natural right of ownership possessed by the author in common with any other proprietor in property which is still within his own immediate possession, and which in no sense, and to no effect, has been parted with by him. The distinction now adverted to between a right of ownership and of copyright, which it is of the very first importance clearly to realize and constantly to keep in view, was, in the recent case of Jefferys v. Boosey, 4 House of Lords Cases, p. 815, thus adverted to by the Lord Chancellor (Cranworth):—"So long as a literary work remains unpublished at all, it has no existence except in the mind of its author, or in the papers in which he for his own convenience may have embodied it. Copyright, defined to mean the exclusive right of multiplying copies, commences at the instant of publication." The publication of a literary work—which means the imparting of it to the public in such a way as that they may lawfully enjoy, and in a certain sense lawfully appropriate it to themselves—must precede the existence of an exclusive privilege in regard to it, created in favour of its author by the law of copyright. By publication—which Lord Brougham has described as "the overt act establishing authorship"—the author of a work has then ceased to be the exclusive proprietor of that work; but in virtue of his character of author of it, a species of monopoly is by law created in his favour, which, like the operation of a patent granted to an inventor, secures to him, for a given time, after the literary work has been published, a right to prevent the public from reproducing, without his consent, copies of that work.

Prior to the introduction of the art of printing into England, by Caxton, in 1474, the question as to the right of multiplying copies of literary productions was not likely to attract much attention, because the labour involved in copying MSS. must necessarily have been such as to interpose a practical barrier against this being done to any great extent. A very different state of matters, however, necessarily followed the introduction into this country of the art in question; and the facilities thereby created of multiplying and circulating the works of literary men naturally suggested the application of, or, to speak with greater precision, gave birth to the law of copyright. Whether the former or the latter of these two expressions is the more appropriate, was for long a matter of opinion on which the learned were not agreed. By some it was maintained that copyright existed at common law antecedently to the 8th of Queen Anne, cap. 19, which statute introduced and imposed severe penalties on literary piracies. The explanation above given of copyright, which describes it as a species of monopoly, implies (for monopolies do not exist at common law) that copyright is exclusively the creature of statute. As this opinion has obtained the distinct and unequivocal approval of Lords Cranworth, Brougham, and St. Leonard's in the above case of Jefferys, the matter may now be considered as settled. Nor is a reference to this question, and to the dicta of these eminent Judges with regard to it, unworthy of attention. Because as the right of copyright may now be held to be one which is not recognized at common law, but which owes its existence entirely to statute, it follows that the privileges thereby conferred can be extended to photographic pictures and productions generally only in so far as these works are included (for, as already remarked, they are not expressly mentioned by statute) within the category of matters falling within the scope and intention of the terms employed by the 15 & 16 Vict. cap. 12. Without troubling you with a specific enumeration of all those literary and artistic works to which the law has extended the privileges of copyright, and of the several Acts of Parliament which have enacted that law, I shall at once address myself to the law of copyright in reference to that section of artistic productions which are denominated prints or engravings, as these seem to me most nearly to resemble photographs of all the enumerated artistic productions protected by copyright, and to form the categories within which—to entitle photographic pictures to claim

the privileges of copyright—they must be shown to fall under the expressions used in the Act of 1852. After having shortly explained the law of copyright in regard to these works of art, I shall then attempt to apply these principles to the class of artistic productions to which the term "Photographic" is applied.

The Copyright Acts, in reference to prints and engravings, are five in number, viz. the Acts of 8 Geo. II. cap. 13; 7 Geo. III. cap. 38; 17 Geo. III. cap. 57; 6 & 7 Will. IV. cap. 59, and the 15 & 16 Vict. cap. 12. To the terms of three only of these Acts, however, shall I require to direct your attention, as the provisions of two of them, viz. the 17 Geo. III. cap. 57, and the 6 & 7 Will. IV. cap. 59, do not fall within the scope of the present paper. The object of the former of these two Acts was to enable engravers to sue for and recover penalties in the case of the contravention of their rights; and the latter was passed to extend the privileges of copyright in prints and engravings to Ireland. The terms of the Act of 8 Geo. II. cap. 13, so far as it is necessary for our present purpose to quote them, are as follows: "Whereas divers persons have by their own genius, industry, pains, and expense, invented and engraved and worked in mezzotinto or chiaroscuro sets of historical and other prints, in hopes to have reaped the sole benefit of their labours," &c., for remedy whereof, &c. be it enacted, that from and after the 24th of June, 1735, "every person who shall invent and design, engrave, etch, or work in mezzotinto or chiaroscuro, or from his own works or inventions shall cause to be designed and engraved, etched, or worked in mezzotinto or chiaroscuro any historical or other print or prints, shall have the sole right and liberty of printing and reprinting the same for the term of fourteen years, to commence from the day of the first publishing thereof, which shall be truly engraved with the name of the proprietor of each plate and printed on every such print or prints," &c.

There are three points deserving of attention in this enactment, viz. 1st, it proceeds on the inductive ground of genius, industry, pains, and expense having been applied; 2nd, it applies to the case only of an engraving, etching, or print, *designed* by the engraver, or by one who causes it to be engraved; and 3rd, the benefits of the enactment are limited to engravings, etchings, &c. of historical or other prints.

This Act having been found ineffectual for the objects intended to be by it secured, the Act of 7 Geo. III. cap. 38, was passed, which, after mentioning this as its inductive ground, provides, "That from and after the 1st January, 1767, all and every person or persons who shall invent or design, engrave, etch, or work in mezzotinto or chiaroscuro, or from his own work, design or invention, shall cause or procure to be designed, engraved, etched, or worked in mezzotinto or chiaroscuro, any historical print or prints, or any print or prints of any portrait, conversation, landscape, or architecture, map, chart, or plan or any other print or prints whatsoever, shall have and are hereby declared to have the benefit and protection of the said Act and this Act, under the restrictions and limitations hereinafter mentioned:.....And be it further enacted, by the authority aforesaid, that from and after the said 1st January, 1767, all and every person or persons who shall engrave, etch, or work in mezzotinto or chiaroscuro, or cause to be engraved, etched, or worked, any print taken from any picture, drawing, model, or sculpture, either ancient or modern, shall have and are hereby declared to have the benefit and protection of the said Act and this Act for the term hereinafter mentioned (*i. e.* twenty-eight years from date of publication), in like manner as if such print had been engraved or drawn from the original design of such graver, etcher, or draftsman," &c.

In this enactment there are also three points worthy of attention, viz. 1st, to the class of prints, historical and others mentioned in the Act of Geo. II., there is especially added prints of any portrait, conversation, landscape, or architecture, and maps, plans, and charts; 2nd, the benefits of copyright are not confined, as in the former statute, to engravings of designs, *designed* by the engraver or by the party who procures that design engraved, but these benefits are extended to engravings of designs by way of picture, drawing, model, or sculpture although not designed by the engraver or by the party procuring the same to be engraved; and 3rd, it may be noted that the period of the endurance of the copyright is extended from fourteen to twenty-eight years.

The enactment contained in 15 & 16 Vict. cap. 12, to which I would call attention, is that set forth in the 13th section of the statute, which is expressly passed for the purpose of explaining the extent to which the Acts relating to copyright in engravings apply, and which expressly provides that the terms engravings and prints are "intended to include prints taken by lithography or any other mechanical process by which prints or impressions of *drawings* or *designs* are capable of being multiplied indefinitely; and the said Acts shall be construed accordingly."

Now, before proceeding to examine how far photographic pictures may be held to fall within the expressions of drawings or designs

capable of being multiplied indefinitely by mechanical processes, allow me to draw attention to the following three circumstances which are deserving of special notice:—1st, that the 13th section of the statute last referred to, appears expressly to have been introduced into the Act for the very purpose of explaining how far the provisions of the two former Acts in regard to copyright in engravings were to apply, and for the purpose of removing doubts as to whether certain prints or engravings did or did not fall within the scope of their provisions; 2nd, that the section in question especially alludes by name to a mechanical process of multiplying indefinitely engravings or prints, viz. lithography, which process is here for the first time mentioned in connexion with copyright in engravings and prints; and, lastly, that although, as already mentioned, photography—which is eminently a process of multiplying indefinitely drawings or designs as well as other pictorial representations—was an art which was in operation several years at least before the date of the statute in question (1852), that process is nowhere mentioned therein.

Having thus so far paved the way to an examination of the question under review, let us advance a step further in our subject, by examining and, if possible, ascertaining what photographic pictures or prints are.

As at present practically applied, the photographic art consists in transferring to the surface of certain substances, by the chemical action of light, the image of some object, picture, or landscape, either directly by the positive, or indirectly by the negative process, whereby the outline and shading of the original are represented, but without the realization of colour. From this definition or description of photography, it will be remarked that while the means employed by the artist, and the peculiar agent by which the sun-picture is realized and developed, differ essentially from the means and materials made use of by the engraver on steel, copper, or wood, the pictorial results obtained by these two processes are in certain essential particulars very similar to each other; and the similarity between them is still further observable in this, that they are both in a very eminent degree, mechanical processes by which pictures or prints may be inpefinitely multiplied. To complete the analogy now adverted to, it is proper to add that within the last few years the ingenuity and skill of Macpherson of Rome, Fox Talbot, and Paul Pretsch have introduced the three processes of photolithography, photoglyphs, and photogalvanographs, whereby the negatives of some pictures may be produced on stone or metal plates, whence positives of these pictures may be indefinitely multiplied. As I understand that patents have been obtained for the two latter processes, it seems to me practically unnecessary specially to refer to them in the present paper.

The classification, therefore, of photographic works, so far as regards the distinctive methods employed for producing pictures, is into positive photographs; photographs taken negatively or by the negative process; and photolithographs. Now, in so far as concerns the subjects whose pictorial representation it is the aim of photography to delineate, these may be divided into simple pictures and composition pictures. From the peculiar means employed by the photographer in producing a picture, it is impossible that his work can ever claim for itself the title of an artistic creation. It can never be anything but a pictorial *reproduction*. As there can be no shadow without a substance, so there can be no photograph without an actually existing material object. Unlike, in this respect, the painter and the sculptor, who can draw from the ideal world of imagination the artistic realities which they create, the photographer cannot for one moment leave the sphere of material existences. The creations of fancy are beyond the ken even of that agent which he employs, whose properties, mighty and subtle as they be, are powerless to detect, far less embody the unsubstantial forms of thought. Hence it follows that the only originality which any photographic picture can boast of, is that which arises from the artificial grouping or arrangement of the objects represented by the picture, as opposed to that natural arrangement of those objects which existed independently of the artist. The latter pictures I denominate simple; and the former, composition pictures. When an artist photographs a natural cluster of rocks, a pile of buildings, or a group of people, &c., he produces what I mean by the term a simple picture; when, on the other hand, he produces a picture which embodies a grouping of objects artificially arranged by the artist himself, such as Rejlander's "Two Ways of Life," or Robinson's "Fading Away," he produces what I mean by the term a composition picture.

Although no distinction, so far as I am aware, need be taken between positive photographs and photographs negatively obtained, as regards the application to them of the law of copyright used in its strict legal sense, I have thought it convenient to contrast these two kinds of photographs for the purpose of alluding to certain rights connected with the latter class, which I think are sometimes erroneously viewed as falling within the term

"copyright," and which may be here disposed of. I shall attempt to illustrate my meaning by two examples. Thus: if I go to a photographic artist who happens to adopt the positive process and agree with him that for a given sum he shall furnish me with a likeness of myself, that likeness on being presented to me becomes mine in exchange for the price paid; and, on the principles of the law of ownership, neither that artist nor any other person can use my likeness to copy from, without my consent. In the case now supposed, I carry away with me, in the shape of the positive photograph, all the likeness of me the artist has taken. There is nothing left of this likeness with the artist which he can use (if he were so inclined) for the purpose of repeating my likeness. Suppose, however, that on another occasion I go to a different photographic artist, and one who happens to adopt the negative process, and that I agree with him for a certain sum that he shall furnish me with a likeness of myself. The likeness which he hands me no doubt becomes mine in return for the price paid; but, in carrying it away with me, I am not, as in the former case, carrying away all the likeness the artist has made of me: for he still retains the negative, and indeed primary likeness; and if he may from that negative repeat at pleasure my likeness and dispose thereof, I cannot be said to have bought the likeness which he took of me, but merely a copy of that likeness. Now it may be quite true that, in the case supposed (I being the subject of the portrait), the artist might have no object to gain in throwing off, from his negative, likenesses of me, because these would bring him no pecuniary return. In such circumstances he would rub off the collodion from his glass plate—thus effacing my image—and have it in readiness to receive that of a more notorious and profitable individual, whose likenesses, let it be supposed, would be eagerly bought up by the public. Whether in the case last mentioned the artist could, without consent of the party whose likeness is taken, make use of the negative likeness he took, to repeat therefrom positive likenesses and dispose thereof, is a point of law which, so far as I am aware, has not yet been decided. It does not appear, however, that its decision could depend on the law of copyright. It would depend on the nature of the contract entered into between the artist and his subject—from a consideration of what it was that, for the sum agreed upon, he engaged to supply, and whether the accidental circumstance of his happening to take likenesses by the negative process conferred on him a right of property in that, viz. the likeness, in which he certainly would have had no right had he happened to adopt the positive process.

Having made these remarks, which I trust will assist you in realizing the distinction I wish to draw between a right of ownership and one of copyright, let me now attempt to apply the principles involved in the latter right to photographic works. For this inquiry these works may, as already mentioned, be divided into pictures taken by the ordinary processes of photography (whether negative or positive), and pictures taken by the photolithographic process. (For the reason above given, viz. that patents have been obtained for the processes of photoglyphs and photogalvanographs, neither of these processes need be specially alluded to.) As regards photolithographic pictures, I think there is some ground for hazarding the opinion that the law of copyright does extend to them. From the mode in which they are obtained, they seem to fall fairly enough within the terms of the Act 15 & 16 Vict. cap. 12, which expressly extends this privilege of copyright to "prints taken by lithography." It is undoubtedly true that this particular mode of writing upon stone, whereby prints or impressions are capable of being indefinitely multiplied, was not known to the legislature when the Act in question was passed, viz. in 1852; but if I may judge of the skill, labour, and ingenuity required successfully to carry out this process, from a description thereof as given in the number of the 'Photographic Notes' for January 1857 (for, not being myself a photographer, I am practically unacquainted with the difficulties of the process), it would seem that it is one which is certainly not less difficult to be realized than was the art of lithography as practised when the Act in question became law; and as the 13th section of the statute was evidently intended, not for the purpose of limiting, but rather of extending the benefits of the law of copyright to certain processes of printing, and as the process in question is undoubtedly one of writing upon stone, there is some reason for the opinion that it falls within the generic term of "Lithography" as occurring in the Act. It is right, however, to call attention to the qualifying expressions in connexion with which the term lithography is used. The expressions are "Lithography, or any other mechanical process by which prints or impressions of *drawings* or *designs* are capable of being multiplied indefinitely." If these words *drawings* or *designs* are held to be taxative or limiting, rather than descriptive or explanatory terms, a doubt may arise as to whether the law of copyright can be extended to photolithographic prints, unless they are in point of fact prints of *drawings* or *designs* in the strict sense of these words. Now, in regard to the meaning of these terms, it is right that I

should mention, first, that the word *drawing* does not occur in the Act of Geo. II., but for the first time in the Act of Geo. III.; and second, that I should remind you that the Act of Geo. III., in which this term does occur, specially provided that copyright was to extend not only to historical and other prints, though not designed by the engraver, or by him who obtained the print engraved (which was the limit in the preceding Act), but also to prints of portraits, conversations, landscapes, architecture, maps, plans, or charts. Taking these two points into consideration, and further bearing in mind that one object of the Act of Victoria was to give, by way of explanation, an extended range to the copyright laws, it would seem to be no unwarrantable construction of the term *drawings*, as occurring in this statute, to consider it as tantamount to pictorial compositions generally. In so far as regards the other term above alluded to, viz. *designs*, it occurs both in the Act of Geo. II. and of Geo. III., and in both instances implies originality on the part of the engraver, or of him who obtains the print designed by himself, engraved. In the Act of Victoria, however, where it is used for the first time as a substantive, I think there is ground for the remark that it does not necessarily imply the idea of originality, but was intended, along with the word *drawings*, to include all kinds of pictorial compositions. This point, however, which I think is not unattended with difficulty, will at once suggest itself to every photographer as one of very great importance. An immense number, perhaps the great majority, of photographic pictures, are delineations of groups and scenes, which on the one hand are copied from no drawings, and on the other imply no design, in the sense of originality, on the part of the artist, but are taken for the first time from actual scenes in nature, to which the artificial terms of a picture or design cannot with accuracy be applied. If, therefore, the privileges of copyright are to extend to photolithographs only in so far as these are prints or impressions, obtained by this process, of *drawings* or *designs* in the ordinary and strict meaning of these terms, it follows that the benefits of copyright in regard to this department of photographic productions are very much circumscribed.

Having thus attempted to direct your attention to the principles of the law of copyright as these may affect pictures taken by the photolithographic process, allow me now to allude to the application of these principles as regards photographic pictures generally — excepting therefrom, for the reason already mentioned, photoglyphs and photogalvanographs. The pictures falling within this category embrace, 1st, positive photographs; and 2nd, negative photographs, produced by one or other of the various processes practised by artists, as the albumen, the collodion, the waxed-paper, the collodio-albumen process, &c.

As regards the former class of pictures, viz. positive photographs, a little consideration of the principles of copyright will be sufficient to show that, as the law at present stands, no such right can attach to them. Copyright, in reference to any subject, implies and presupposes two elements as existing in connexion with that subject,—viz., 1st, that the subject does from its character imply an inherent capacity of indefinite self-reproduction or repetition; and 2nd, that the subject so capable of being reproduced, has been so parted with by its author, that some one, other than he, might, if not restrained by law, be able, without his consent, to benefit by the industry of the author of that subject, and reproduce indefinitely that subject which is the result of his labour—or, in other words, that the subject has been published. Now observe: a positive photograph is in all cases devoid of the former element, that, viz., of inherent self-reproduction. It is no doubt quite true that the positive picture in question might be copied, say by the negative process, and might thus indirectly be repeated *ad infinitum*; but the law of copyright then (assuming it to exist at all) would attach not to the positive, but to the negative picture. This may appear to be somewhat strange law, and to involve little more justice than is implied in the popular maxim of "robbing Peter to pay Paul." But such is not the case. In the case supposed, the positive picture does not require the aid of copyright to protect the interests of its owner. The law of property or of ownership is quite enough for this purpose. This positive photograph cannot, any more than a painted picture, be published, in the legal sense of this term; and this being so, the law of copyright cannot attach either to the one or to the other. The photograph, like the painting, remains and must ever remain private property; and being so, it is within its owner's own power to prevent any one taking a copy of it without his special permission. The terms of that permission are a matter of contract, which law will not interfere with, save to construe and enforce. Nor is the law on the matter at all affected by the character of the subject represented by the positive photograph, or its value as a work of art, or the expense and trouble involved in its production. If I am the artist of the picture, these matters will all enter as elements into the question, at what price will

I part with this picture? and if I am a desiring purchaser of it, what price am I willing to give to obtain it? But unless there are special provisions to the contrary (which of course is a departure from the question of abstract law), the sale of the negative photograph, just as of the painting, confers an unlimited right of ownership on the purchaser, who, if he please, may get the photograph rephotographed by the negative process, and so have the power of indefinitely multiplying it, just as the owner of the picture may get the picture engraved, and by this means acquire the power of indefinitely multiplying it.

Now there cannot be a doubt—for law has expressly conferred the right—that engravings may be the subject of copyright. What is next to be considered, therefore, is—does law extend such a privilege to negative photographs? In attempting to solve this point, let me premise two remarks. First, law does not seem to have intended that copyright should extend to works capable of being indefinitely multiplied, however beautiful, or even useful in a scientific point of view those works may be, merely *because* they are beautiful or useful. It is further required that, to entitle a work to the benefits of this right (*i.e.* to protect it against being multiplied without its author's consent), there be implied in its production the outlay, to a greater or less extent, on the part of its author, of genius, industry, pains, and expense. Secondly, neither was the privilege of the law of copyright intended to secure a profitable pecuniary return to the investment or outlay of capital, on behalf of an individual who may have spent a given sum of money in the hope or with the view of making a profit from the sale of copies of a work of art. An indirect effect of the law of copyright may have been, in many cases, to secure this result; but such was not the object of the law. Therefore it is not a sufficient ground for claiming on behalf of a negative photograph the benefit of copyright, to show that, unless that right be conceded to its author, the money which has been spent in producing or procuring that negative will entail a loss on him. To such a representation, law replies, "It is not my business to teach you prudence in the investment of your capital." To entitle it to the privilege in question, the literary subject, which, from the shape in which it is published, is liable to be multiplied indefinitely, must in its production have involved to a greater or less extent the outlay of personal and mental industry, skill, and labour. The various literary subjects, one and all, on which law has specially conferred the benefits of copyright, illustrate this remark; and one reason which to me appears to suggest (I do not say to justify) a doubt whether photographic negative pictures may claim a like privilege (they not being specially mentioned in the 15 & 16 Vict. cap. 13), is that they do not involve in their production such elements of industry, skill, and labour as are found more or less to characterise those other literary subjects which are enumerated in the Acts conferring copyright on engravings, prints, maps, plans, &c. Had photographs been specially mentioned, as printing by means of lithography is, then the same reason, that seems to lend plausibility to the view that under this term of Art may be included photolithographs, would have settled the point in regard to photographs generally. But such is not the case; and therefore it is that, in order to solve the question, we must attempt to discover whether, though not expressly named, they are, or are not included within the spirit of the Act.

One attribute or characteristic common to all the subjects mentioned in the Act, photographic negatives do possess in an eminent degree—they are peculiarly capable of being indefinitely multiplied. As pictorial designs, they may also be said to bear a strong generic resemblance to many descriptions of engravings, and, though called by another name, to be very much the same thing as engravings. But here the resemblance seems to end. The inductive ground for extending copyright to engravings, maps, &c., viz. to secure to their author a return for "genius, industry, pains, and expense" bestowed on the production of these works, can scarcely, I think, be truly applied to the production of negative photographs. In the production of an engraving of any painting worth engraving, consider the amount of labour bestowed. There is the genius of the artist, in the conception of the design of the painting and the embodiment of that conception on the canvas. This ideal creation, so embodied on the canvas, is the result, it may be said, of the education of a lifetime. The artist's knowledge of life and manners, his appreciation of character, his power of delineation, his fancy, his judgment, his historical and literary information, acquired by years of study and thought, are, not less than the hours of patient labour of mind and hand which have been immediately bestowed on the painting, the price which the production of that particular work of art has cost. And what patient toil and skilful dexterity of manipulation are required to transfer to, or delineate with faithful accuracy this picture on, the steel or copper plate whence are multiplied copies of this work! The labour involved in producing a good engraving of an average-sized painting is

not that of hours or days, but of weeks, months, nay, even in some instances, of years.

Or take the case of map-making. Consider what labour is presupposed in the compilation of an atlas fitted to represent the present state of geographical knowledge. A map may not imply the same kind of originality as a painting; it may not presuppose the exercise of the imaginative faculty; but it certainly implies originality in the condensation, arrangement, and delineation of topographical and physical facts—to unite which in one consistent whole may be, in some respects, even a more difficult feat than the most successful pictorial embodiment of a poet's fancies. Compared with the mental labour gone through in the composition of a painting or a map, and the manipulatory skill and toil requisite to their faithful delineation as engravings or prints, the production of a negative photograph is little else than a pastime. I wish not to disparage the art of the photographer; nor, in saying what I do, am I forgetful of the experience, skill, and, if I may be allowed the expression, the adaptive taste required in the combination and use of those chemical elements, through whose agency and that of light the picture is produced, and which compose what is technically termed the "process" adopted. I admire and am astonished at the marvellously beautiful products of the photographic art; nor am I less struck by the skilful manipulation and educated taste of the photographer, the exercise of which is essential to the production of these beautiful artistic results.

But granting all this, and giving to the photographer credit, to the fullest extent, for the exercise of taste and skill in the arrangements and manipulatory process generally which precede and follow the taking of the picture, there is this important difference between the engraving and the photograph,—that, while the production of the former is achieved, and only achieved, by personal labour directly applied to the particular work of art, the production of the latter is achieved without the intervention of any personal labour whatever. For, observe, up to that point of time at which the photograph as a particular work of art is begun to be produced—and when alone the privilege of copyright could come into existence in regard to it—the means by which it is then produced is not a work of art, but a process or mechanical means whereby similar works of art generally might be produced.

But copyright does not and cannot attach to the means by which works of art generally may be produced. This may be the subject of patent, but not of copyright. Copyright can only apply to a particular work of art *when produced*, and arises out of a privilege of law, conferred just in respect that that particular work of art has in its production involved personal and mental industry, skill, and labour on the part of the artist. Now photography does not do this. Not merely does the photographer not conceive the picture which is produced, but he does not even produce the picture. Nature is the artist of the picture portrayed; and nature also is the artist that portrays the picture. The photographer, no doubt, prepares the glass plate, or sheet of paper with the delicate chemical solutions, on whose sensitive texture the pencil of light is to draw the picture, and thereafter cunningly presents this magic tablet to the scene which he wishes to represent. This having been done, he has done all. His labours cease at the very moment when the execution of the picture as a work of art commences, and at the very point of time at which, if the picture were a painting or an engraving, the labour of executing it would begin. That this description represents the truth, will, I think, be admitted. If corroboration of its faithfulness be required, I may remind some, and inform others of you, that one of the most beautiful of the many beautiful photographs in your present exhibition, viz. 'An Interior of Roslyn Chapel,' was obligingly drawn by nature herself, when the owner of the camera, absent from the scene of his artistic triumph, was eating his breakfast, and enjoying his morning pipe. To prevent misconception, let me again repeat that I fully admit that great skill and taste, perhaps even considerable labour, are requisite on the part of the photographer in those antecedent arrangements which precede the actual taking of the picture, its after-development, and printing off, and above all, in the successful manipulation and scientific combination of those chemical agents which compose the particular "process" employed. But what I say of these arrangements and that "process" is, that they are a mere means toward an end; they do not constitute in themselves a work of art, and hence cannot be the subject of copyright, however they may be the subject of a patent; and if so, no amount of labour, skill, and industry, however great, involved in *their* production or use, can form a just reason for claiming in their behalf a right which law neither intended to extend nor has extended to them, viz. that of copyright. This right is attachable only to a particular work of art, not to a process for producing works of art. The latter may be the subject of a patent, but cannot be the subject of copyright.

To these observations, of whose soundness it

is for you to judge, I must add this remark, that while the 13th sec. of 15 & 16 Vict. cap. 12 was expressly introduced for the purpose of removing doubts as to the extent to which this Act, and the previous Acts of 8 Geo. II. cap. 13, and 7 Geo. III. cap. 38, were to be held as extending the privileges of copyright in favour of engravings and prints, &c., it does not specially refer to photographic works, although, many years prior to the passing of this Act of Victoria, viz. 1852, the art of photography had been introduced, and at its date was pretty extensively practised. An omission such as that now referred to, is, in the circumstances in which it has occurred, of peculiar significance, when it is observed that, although the process of photography has been omitted, that of lithography has been inserted. From this circumstance there is ground for the remark (on the principle of the legal maxim, "the express mention of one thing implies the exclusion of another") that, although the statute intended to extend the privilege of copyright to lithographs, it did not intend to extend the same privilege to photographs, and has demonstrated this intention by naming the one and omitting to name the other.

Having made these remarks, I think I have suggested for your consideration the chief arguments which can be advanced against the view that negative photographs do not fall within the provisions of the law of copyright. The principal argument in favour of the converse of this proposition (viz. that negative photographs do fall within the law of copyright) lies in this, that a negative photograph equally with an engraving, print, or lithograph is eminently "a mechanical process by which prints, or impressions of drawings or designs, are capable of being multiplied indefinitely," and that, as so falling within this category, the privileges of the law of copyright are (indirectly it may be, but not on that account the less effectually) conferred on negative photographs, under this descriptive clause occurring in the statute.

As the view last suggested is the one which most of you, I doubt not, would wish to be correct, and as it may very possibly be in point of strict legal construction the true one, I shall now assume it to be so, for the purpose of drawing your attention, in conclusion, to the practical effect which the existence of the law of copyright will have on the rights of the authors and owners of photographic works. At the outset of the remarks on this subject, I must again beg you to observe that a right of ownership is quite distinct from a right of copyright, and that the latter right only comes into existence at the date of publication. In the words of Lord St. Leonards, "When we are talking of the right of an author, we must distinguish (as has been already very accurately done) between the mere right to his manuscript and to any copy which he may choose to make of it as this property just like any other personal chattel, and the right to multiply copies to the exclusion of every other person. Nothing can be more distinct than these two things." And again, in the words of Lord Brougham, "The right of the author before publication we may take to be unquestioned, and we may even assume that it never was, when accurately defined, denied. He has the undisputed right to his manuscript; he may withhold or he may communicate it; and communicating it, he may limit the number of persons to whom it is imparted, and impose such restrictions as he pleases upon their use of it. The fulfilment of the annexed conditions he may proceed to enforce; and for their breach he may claim compensation..... But the doctrine of copyright, after publication, assumes there exists, by force of law, an implied notice to all the world against using the book or paper except in one way, namely reading it."

As a positive photograph possesses no inherent capacity of self-multiplication, the right in regard to it, which belongs to its author or owner, is one of property alone. A right of copyright cannot attach to it. In this respect a positive photograph resembles a painting. So long as the artist or owner of it possesses it, it is beyond the power of any one to make a copy of it, except on such conditions as the artist or owner may impose. Neither a positive photograph nor a painting is ever published, in the legal sense of that term. To this class of photographs, therefore, the law of copyright cannot apply. The photographs to which alone the law of copyright (assuming it to exist) can apply, are negative photographs. Under this category are embraced photolithographs, photoglyphs, and photogalvanographs; but to these several classes of negative photographs I shall not, for the reasons already mentioned, separately allude.

Negative photographs, like engravings, are capable of indefinite self-reproduction, and therefore of being "published," in the legal sense of that term. When the moment of publication arrives, at which moment the hold of the proprietor of the negative photograph ceases, the point of time has arrived at which the privilege of copyright can attach. Up to that moment the right in the negative photograph was a right of ownership; the author of that negative might have locked it up, and not given it to the world; but when the moment of publication has arrived, *eo instanti* the photograph escapes the artist's grasp; his

right of ownership in it ceases, it becomes the property of all, but—in virtue of the law of copyright, the property of all to the limited extent merely of looking at and admiring it, not of making or multiplying copies of it.

From the circumstance that photography deals exclusively in the pictorial reproduction of physical facts, a question of importance connected with the law of copyright occurs, which may be thus expressed. Assuming that two photographers have each taken a negative of the very same subject, can one of them restrain the other from publishing his negative? and if so, to which of them would the exercise of this right belong? This question suggests another, viz., assuming the scene represented by one photographer to be the pictorial reproduction of one actually existing in nature, and therefore entirely independent of the artist who realized it, can another photographer, instead of going through the form of going to the scene in question and taking it from nature, take it from the photograph already executed? The key to the answer of the former question lies in the application of the maxim (lately expressed by Vice-Chancellor Wood) "there is no copyright in facts;" and the key to the answer of the latter question lies in the application of the principle, that no one author is entitled so slavishly to copy the literary work of another, as to take the benefit to himself of that other person's skill and labour. I shall illustrate my meaning by two examples. The charge of the Light Brigade at Balaklava was as much an actual physical fact as is at this moment Sir Walter Scott's monument in Edinburgh, albeit the duration of the existence of the former as an actually realized fact, was much more momentary than has been, and I trust will continue to be, that of the latter. Now, in order that two photographers might have obtained the pictorial representation of that charge from the subject itself, it is necessary that both should have been on the scene at the same time, and both photographed that charge at the same moment. But as the charge so photographed by both artists was the pictorial representation of a fact, and not an artistic creation personal to either, both had an equal right to represent that fact pictorially, and to do so when they pleased. Neither the momentary character of the fact so occurring, nor the chivalrous and romantic nature of the feat performed and portrayed, takes it out of the category of a fact patent to all the world, and which all who chanced to be in a position so to do, might pictorially reproduce. Nor does the circumstance that one artist photographed an actually existing subject sooner than another, or published that photograph sooner, at all affect the question.

In the case supposed, of the charge of the Light Brigade, the momentary existence of this charge as a fact necessarily implied that it was photographed by both artists at the same instant. But this is mere accident, arising out of the physically short-lived existence of the fact. An artist who may have photographed Sir Walter Scott's monument last summer, and published it, cannot debar another artist from photographing the same monument this coming summer, and publishing that photograph, albeit the subjects of both pictures is precisely the same. But it is a condition attaching to the right enjoyed by a photographer to produce and publish a picture of an actually existing scene which has been already photographed and published by another artist, that the second picture be photographed from the scene itself, and not produced from the picture of it already taken by another artist. It may be quite true in the case of a photographic picture—since no originality on the part of the artist enters into the design—that a photograph taken from the scene itself, or from the picture of that scene already produced, will represent so accurately the very same thing, and realize so necessarily the very same pictorial result, as to render it impossible to detect that the second picture (though really taken from the other) was not taken from the actual scene itself. Further, the operation of photographing from the picture may have imposed on the artist just as much trouble and labour as would have been involved in taking his photograph directly from the scene itself. But all this does not alter the nature of the thing done. The difficulty of detecting the *modus operandi* does not alter the fact that the second artist, in the case supposed, has profited by, and availed himself of, the labour or trouble, however great or little that may be, which it cost the first artist to obtain from nature, in a propitious moment, the picture realized. If an original picture was or may be obtained at little cost, there is all the less reason for not applying to the source whence it was obtained, and consequently all the less excuse for the second artist not having done so; and if the cost be great at which the picture was or can be obtained from nature, it is all the more reason why the artist who obtained his picture from this source should exclusively reap the reward of his good fortune. Nor is such good fortune always of easy attainment. Like a fair woman, nature often refuses to yield up her charms except after much solicitation. To the importunate lover only will she grant his request; and many a weary mile may she have led him, and many an

anxious hour may he have waited, ere his coy mistress will grant him the favours for which he sues.

It is scarcely necessary to add, that the remarks just made apply with equal, indeed, if possible, with greater force to that class of negative photographs which I have denominated composition pictures, wherein the grouping of objects, as represented therein, is arranged by the artist himself. This element of artificial combination takes the picture out of the category of a mere pictorial reproduction, and stamps it with the characteristic of a conception, whereof the artist is the author. The picture is his in a double sense. It is his in virtue of his having expressed in a pictorial form existing objects; and it is further, and in a peculiar sense, his in virtue of the element of artistic arrangement which he has superadded, and which has clothed it with the attribute of a design, the exclusive literary property of the designer.

I have thus endeavoured, I feel, very imperfectly, to suggest for consideration some of the leading principles of the law of copyright, with the view of assisting you in applying these principles for yourselves to the solution of the question suggested by the present communication. Permit me, in conclusion, to express my acknowledgements for the honour done to me in having been permitted to occupy so much of your time with this paper, which, I can only regret, is so unworthy of the subject of which it treats, and the Society before which it has been read.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

A Meeting of the Blackheath Photographic Society was held at the Golf Club House, January 17, 1859. The President, J. Glaisher, Esq., F.R.S., in the chair.

After the usual business had been transacted, the following paper was read by Charles Heisch, Esq., F.C.S.

Observations on the Dry Collodion Process.

I am not about to bring forward "another" new process, and possibly not to say anything new; but I think one object of Societies like our own is, that each member should give the others the benefit of any observations he may make while working. During the past season I have been working at dry processes, and, like most others, spoiled a good many plates before I got any good results; and it is the hope of preventing some other beginner from spoiling so many, which has induced me, in the absence of any regular paper, to make a few observations this evening. Until this last season I had never tried any of the dry processes, because I had never seen any pictures on dry plates which weie not hard black and white things compared with those on wet plates*; but at the beginning of last summer Mr. Heath showed me some pictures taken by the Rev. Mr. Cleaver, which equalled anything I had seen on wet collodion. Mr. Heath kindly procured for me the process employed by Mr. Cleaver, which I found to be Lyte's metagelatine process, with the addition of a little honey or citric acid to the gelatine solution: but the collodion he employs contains a large proportion of bromide; and on this, I believe, depends the beauty of his results.

In the last Number of the Journal, Mr. Cleaver has published his process, which differs in one or two points from the one he originally sent to Mr. Heath. You are all aware that I advocate the use of two equivalents of iodide to one equivalent of bromide of ammonium for landscape-collodion, wet or dry; and I believe the condition of things to be just about this, —that you may take six views on a wet collodion with only iodide, and, by a proper arrangement of stops, &c. five out of the six will be very good, but the sixth will not, though by the use of a proper proportion of bromide it may be taken well and easily—while on a dry collodion, if it contain only iodide, for one view that you can take you will find five that you cannot, that is, if you look for anything like delicacy of half tone and proper effect. I now always employ the same collodion for dry plates which I before described to the Society, using nothing but iodide and bromide of ammonium. Some difference of opinion exists as to the collodion best suited for dry plates,—some advocating a pyroxyline made at a higher temperature, some as expressly directing a low temperature to be employed.

My own experience is in favour of a pyroxyline made at as high a temperature as possible without producing an explosion, and using plenty of it in the collodion. There is but little use in giving formulæ for making pyroxyline, as many very good ones are published: but it is impossible to publish the one great requisite, experience; and every one must make up his mind to make a good deal of bad pyroxyline before he makes any uniformly good.

I make my collodion as follows:—

Pyroxyline	8 grs.
Ether	5 drachms.
Alcohol	1 do.

* I do not, under the head of dry processes, include the honey, as that is rather used as a means of preventing the plate from drying.

Iodizing solution—

Iodide of ammonium	..	36 grs.
Bromide do.	..	12 grs.
Alcohol	....	2 ozs.

2 drachms of this solution to 6 of the collodion.* This makes a very strong and highly-iodized collodion, and requires a bath of proportionate strength; for in collodion, as in paper, if the bath be weak in proportion to the collodion, the iodide is not firm in the film. This is the case to even a greater extent when bromides are employed than with simply iodized collodion. The bath I find work the best is made thus:—Dissolve 1 oz. of nitrate of silver in 3 of distilled water; to 2 ozs. of this add about 3 grs. of iodine and 1 gr. of bromide of ammonium previously dissolved in a little water; making the whole up to 9 ozs. by the addition of water and ½ an oz. of spirit of wine, filtering, and finally adding the remaining oz. of solution of nitrate of silver. It will be observed that the iodide and bromide are added to the bath in the same relative proportion as to the collodion. I have tried using them in different proportions, but never got the bath to work so satisfactorily. It is just possible that this may be accidental, but so it is. The salts of potassium may be substituted for those of ammonium in the bath, preserving the same relative equivalent proportions. I have been led to enter into these details concerning bromized collodion because some of my friends have been troubled with streaky plates, &c., when endeavouring to use it, and as I believe it to be the proper thing for dry plates, they are not altogether out of place here.

With respect to the various substances that have been proposed for coating the plates, I do not know that, as far as the results are concerned, any one is very superior to the others. The great point seems to be to use it as thin as possible so as to form a coating at all, and to put it on the plate in a proper manner. I prefer the use of metagelatine because of its convenience; it will keep any time when well prepared, which renders it superior to albumen, which must be used pretty fresh; and it may be used cold, which makes it much more convenient than gelatine. What I have used was according to Lyte's formula, only with the addition of more spirit. It consists of 1 oz. of gelatine, 18 of water, and 2 of spirits of wine. This ensures the keeping of the solution, and makes it run very limpid. The addition of citric acid I am inclined to think no improvement; it appears to have a tendency to produce that great intensity which is the great evil of dry plates. With respect to the addition of a little honey, I can hardly yet make up my mind, but I think it may give increased sensibility.

For washing, I have used the vertical bath as recommended by Mr. Cleaver, and believe that it is better not to wash the plates too much. A quart of water will wash a dozen stereoscopic plates quite well. Much has been said on the necessity of drying the plates in an oven, before coating them with the collodion, to prevent blistering; I have no doubt it is a good plan for those who have convenience for it, but if the collodion be kept for some little time after iodizing, and the metagelatine be thin enough, I have not found it necessary. I have found the collodion work well after keeping a fortnight or so. The coating the plate with the metagelatine is the most important part of the process, and it is the proper management of this that enables one to dispense with so much washing. When I first began, I did as is usually directed—drained the plates after washing, poured on the preservative solution, and worked it backwards and forwards on the plate for some time before draining it off, and ninetenths of my plates turned out bad. The preservative solution has of course a much higher specific gravity than the film of water on the plate, and when thus mixed with it, makes those whirling sort of marks which always accompany the mixing of solutions of different specific gravities; and even if the movement of the plate be continued until all these whirls cease to be visible, the sensitive coat is often marked indelibly; moreover, whatever nitrate of silver may remain in the film of water on the plate, is thus mixed with the preservative solution, which renders it necessary that the washing of the plate should be very perfect before the said solution is applied.

By proceeding in the following manner I have never had a marked plate. After the plate is removed from the water-bath let it drain well, with its lower edge on some blotting-paper, and dry the back of the plate also with blotting-paper. When well drained hold it quite horizontal (a pneumatic plate-holder is the best thing for this purpose), and pour some of the metagelatine all along one of the shorter edges of the plate (about 2 drachms does for a stereoscopic plate); then tilt the plate very slightly, so as to make the solution flow in one slow even wave to the other end of the plate, not slanting across it. The solution being more dense than the water on the plate, forces the latter before

* The alcohol is distilled first from chloride of calcium, and then from potash, and the ether from potash, so that both are anhydrous and free from all products of oxidation. They should be preserved in small bottles quite full.

it, and leaves only what is actually in the pores of the collodion: it is quite curious to see the quantity of water thus pumped out, as it were, from a plate which seemed perfectly drained. When the solution has all collected at the lower edge of the plate, tilt it very slightly towards one corner, and allow the excess to flow off, then pour on a second quantity of the metagelatine in precisely the same way and at the same end of the plate as the first, and let it flow off in the same manner. This second quantity may be used again, for the first coating of another plate. The plate should then be placed upon end to dry, when it is ready for use. The only other point on which I have anything to remark is the developing; and much depends on doing this sufficiently slowly.

First make a developer as follows:—

Pyrogallic acid	6 grs.
Spirit of wine	$\frac{1}{4}$ oz.
Glacial acetic acid	$\frac{1}{4}$ drachm.
Water	$5\frac{1}{2}$ ozs.

After the plate has been well wetted with distilled water, pour over it a solution made by mixing $\frac{1}{2}$ oz. of the above with $\frac{1}{2}$ oz. of water and 2 drops of a 30-gr. solution of nitrate of silver. This developes the picture very slowly and of a feeble light-brown colour; but the development may be continued till all the details are brought out in the deepest shadows. When this is the case, wash the plate and cover it with the undiluted developer with 4 drops of silver solution to the ounce: with this, any degree of intensity may be obtained; but a rather feeble-looking negative prints best, as the peculiar colour of these dry negatives stops out the chemical rays very perfectly, much more so than would be supposed from their appearance. If you begin developing with a stronger solution, or one containing more silver, the high lights develope so much more rapidly than the rest of the picture, that they become opake before the detail is half out. The plates are, of course, washed and fixed in the usual way.

Ink Printing and Carbon Printing.
To the Editor of the Photographic Journal.

21, Ainslie Place, Edinburgh,
February 7, 1859.

Sir,—I am pleased to hear that Mr. Hannaford has been so successful with the ink-process which you published in the Journal of November 22nd. I have never had any hesitation in stating my opinion, that the principle of it is very much better than that of M. Sella's or Mr. Perry's, both from its greater simplicity and from the introduction of the oxidizable vegetable acid. Would you, as soon as you have space for it, be so good as insert the continuation of the paper of the Journal of November 22nd, which I sent you shortly after it came out? as it contains some further details regarding the ink-printing process which might be of use to Mr. Hannaford and others who may be working with it. Mr. Hannaford has, I perceive, added a gold toning-bath, which may, possibly enough, be an improvement, though I should hardly have expected it to be so; and it seems almost a pity, unless something *very decided* is gained by it, to introduce this expensive material into a process, one great recommendation of which has been, hitherto, its comparative cheapness. Had I been inclined to recommend his having recourse to any one of the rarer and more expensive metals, I confess it would have been to vanadium rather than to gold, the salts of vanadic acid and also of vanadic oxide having the property of striking a very deep colour with those of gallic acid (probably also tannic and allied acids), and this colour being remarkable for its permanence and power of resistance to the action of generally destructive agents. Long ago I made some experiments with vanadium; and were it not so expensive, it might probably be made of some photographic utility; and even now I think its application as a toning-bath to the ink-prints is deserving of a fair trial.

As to another process published in the same paper of November 22nd—the carbon-printing process, by printing *through the paper instead of from the front of it*,—I perceive, from one of the other photographic periodicals, it is being brought into use by a Mr. Blair at Perth. He appears to be of opinion (and he is perhaps not far wrong) that, in this process or modification of carbon-printing, I have at length "solved the problem of carbon-printing," though (of course from not being in the habit of seeing 'The Photographic Journal') he has omitted to mention my name in connexion with it.*

* A careful consideration of the principles of printing with insoluble pigments in combination with bichromates and gelatine, gum, or allied mixtures, pointed out to me this mode of printing from the back as the only one by which perfect gradation of light and shade could be expected. With paper there are of course two attendant disadvantages. First, the loss of time, making it take fully as long to print from a collodion negative as it would otherwise to print from a paper negative on paper of the same degree of semi-opacity. Secondly, the loss of delicacy, from the unequal translucency caused by the grain of the paper, rendering great care advisable in selecting thin and *uniformly* translucent-structured papers. By printing on glass, sheet gelatine, or similar media (with proper contrivances as to incidence of light), however, all this is avoided; and there does seem no reason whatever

I hope to have the specimens of bromide and of iodide salted paper, sensitized with ammonio-nitrate, ammonio-citrate, and ammonio-succinate of silver, &c., ready to send you in a few days; also some other more rapid processes alluded to in my paper; also some ammonia-fixed prints, and some new dry-collodion plans which I have long had hatching, and have now put into a professional photographer's hands to make some specimens of. I hope to send you some platinum-toned prints also.

C. J. Burnett.

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why, on such media, we should not get, in carbon, or metallic oxides, or similar pigments, quite as perfect a rendering of the negative printed from, as the old principle of printing by silver, &c. could give us; and there seems no absolute impossibility in printing in the first instance on glass, and then, by methods allied to those now practised (in the opposite direction) with drawings, transferring them to paper.

For being burnt-in, such photographs would, as I have pointed out, from the quantity of pigment fixed, have great advantage, and, on glass and other transparent media, might in this way be printed at once (from the back) on the surface into which they are to be burnt. In *some* cases also, where the substance is not intended to be *finally* transparent (*e. g.* that of some stereoscopic prints), the same plan might still be pursued, applying afterwards a white varnish or enamelling on the *back* of the glass; or we might, after the printing, by a protracted cooling operation, convert the glass into what is known as Reaumur's porcelain. All these plans should be considered with reference to both ordinary and stereoscopic pictures on glass, as well as those employed in the decoration of vases, &c.; and such plans on clear glass with metallic oxide, which will burn-in of a black, yellow, or red colour, might be of some use in the manufacture of comparatively indestructible negatives. For burning into the less transparent substances, as tiles, stoneware (and possibly most porcelain), such prints would require probably to be first printed on thin paper, and then placed on the porcelain, either by some process of transference, or, more simply, and probably better (by the same plan employed in ordinary porcelain decoration), by attaching, by gum or other cement, the paper and print together to the fabric into which it is to be burnt, the paper of course burning away in the furnace, while the oxides or other substances unite with, or attach themselves to, the silicates, &c., of which the fabric consists. As soon as I can find time and opportunity, I mean to get ready some specimens of carbon or oxide printing on these plans on glass, if this description is not sufficient to induce some of your readers to save me the trouble and necessity of so doing.—C. J. B.

Heliographic Researches.

By M. Niépce de St. Victor.

M. Niépce de St. Victor has been pursuing with great diligence, and with corresponding success, his researches into those heliographic phenomena which appear to prove the actual absorption of light in all photographic results, and under all circumstances of exposure to the solar influences. The results obtained are so remarkable, that we are induced to make an abstract of a communication from M. Niépce, which was read by M. Chevreul before the *Académie des Sciences*.

When papers which have been prepared with starch and soda, or potash, or cyanide of potassium, are exposed to sunshine, and then washed with the tincture of turmeric, a yellow image is produced over all the exposed parts; if washed with the blue solution of turnsole, it becomes red over those divisions.

If the ozonometric paper of M. Honzeau, composed of reddened turnsole and iodide of potassium, is exposed to light behind a negative photograph on glass, and if after exposure it is passed into water, the exposed parts become blue, the covered parts remaining red.

If a paper prepared with the nitrate and oxide of uranium and nitrate of copper is exposed to the sunshine under the same circumstances, the exposed parts become of an ashen grey. If a design is traced with a solution of those salts, and the paper be then exposed to sunshine, the image speedily appears. It is extraordinary that this image disappears in the dark, and it is revived again in the light.

M. Niépce has shown that under all circumstances papers covered with starch will, when exposed to solarization, acquire the power of decomposing the iodide of potassium, and of becoming coloured by a solution of indigo or of logwood, the unexposed portions remaining without these properties.

If two pieces of cotton, one wet and the other dry, be exposed to sunshine, and then, in the dark, a solution of nitrate of silver be poured upon them, the silver will be quickly reduced on the moistened tissue, while the reduction takes place very slowly upon the dry cloth.

Vegetable earths are susceptible in a very great degree of acquiring this heliographic activity. If soil is taken from a depth in the earth and kept in darkness, it produces no effect upon papers spread with chloride of silver and extended above it. If this mould is spread on a plate of metal, and, after drying, it is exposed to the sun, one part being covered with a screen, it appears in the exposed parts to have undergone a very remarkable change; for if now a sheet of paper spread with chloride of silver is stretched over it *in the dark*, all that portion of the paper which is *opposite the soil which has been solarized will receive a strong impression*, none whatever being made by the unsolarized portion.

It is found by M. Niépce, that all kinds of earth and clay are susceptible of acquiring very great activity, which is exerted in darkness, as in the above experiment. He proposes to continue during the approaching season his researches upon vegetation, and on the maturing of fruits under the influence of this absorbed power, which acts in all respects similarly to the chemical power of the solar rays.

It will be in the memory of many of our readers, that M. Niépce found that a long cardboard tube, presented directly opposite to the sun, absorbed and retained a chemical power which could be employed in the production of photographic pictures. He has now demonstrated that if, after exposure to brilliant sunshine, the tube is care-

fully closed with a cover, and then placed in a tin case, it will at the expiration of six months exhibit so much activity, that photographic paper placed at the mouth of the tube is blackened, or, if it is placed with a negative on thin paper over it, that it will produce a photographic picture. The bottling of sunshine is here seen to be an established fact.

By the investigations of M. Niépce we learn many of the conditions under which the fading of colours, either of dyes or pigments, takes place. These appear to have an especial interest to M. Chevreul, whose papers on dyeing, and whose work on colours, are well known to our readers.—*Contribution of Robert Hunt, Esq., F.R.S., to the 'Art Journal.'*

To the Editor of the Photographic Journal.

Sir,—In No. 77, date 21st January, 1859, of the "Photographic Journal," among the Press notices of the Photographic Exhibition in Suffolk Street, under the head "Architecture," from the 'Athenæum,' occurs the following:—"In architecture Mr. Fenton ranks quite first as a 'New Master,' sometimes broad and crumbly as Prout's ripe Stilton, old and mildewy; sometimes fine and graduated as Turner." It then goes on to say — "His 'Wolsey's Gate, Ipswich' (622), is rich in tone and impasto; the bricks seem really thick and crusted."

The latter part of the criticism is perfectly correct, except in attributing the photograph of the "Wolsey Gate" to Mr. Fenton; it is by Mr. R. Cade of Ipswich, already so well known for the exquisite softness and delicacy of tone, combined with minute detail, of his works.

The correcting the mistake as to the authorship is only an act of justice which will in no way detract from the accuracy of the criticism.

R. T. E.

To the Editor of the Photographic Journal.

Ramsgate, Feb. 1, 1859.

Sir,—In No. 76 of the Journal, I noticed that a correspondent complained that the films of plates prepared by Mr. Fothergill's process "cracked and peeled off in drying." I was troubled with the same annoying source of failure when I commenced the process, but found that it was completely obviated by allowing the plates to dry spontaneously after fixing, and only warming them when required to varnish.

I have used Keene's collodion; perhaps your correspondent has not given it a fair trial.

John C. Twyman.

Photography in Medical Science.

Photography is so essentially the Art of Truth—and the representative of Truth in Art—that it would seem to be the essential means of reproducing all forms and structures of which science seeks for the delineation. The influence of suggestion—strong enough to move the four-legged tables of the Spirit-rappers, as Faraday and Carpenter have shown—is certainly more than sufficiently strong to make the hand of the draughtsman deviate from the strict imitation which he should observe as his guiding-law of design; and if the artist be also the theorist, it is very certain that visible objects will arrange themselves to his eye in accordance with his theory, and far otherwise than as they are seen by others than himself. And so he draws the ideal rather than the actual. The great solar artist has no such preconceived notions, and invariably represents things to us as they are. We were therefore surprised, in passing through the rooms of the Photographic Society lately, to find so few photographs which had any bearing of what kind soever upon surgery, medicine, and the allied sciences. It is much to be regretted that the great resources of the Photographic Art—seen here in a hundred beautiful forms—have not yet been more fully applied to the purposes of our art.—*Lancet.*

ANSWERS TO CORRESPONDENTS.

F. S. A.—We believe photo-lithography has been practically applied to the illustration of books in this country, but cannot inform you where you are to seek assistance. In Palfrey's 'History of New England,' there is a photo-lithographic copy of a map, and of "the portraicture of Captayne John Smith, Admirall of New England."

H. W. F.—The Collector of the Society attends the meetings regularly, and will be happy to receive any subscription which you wish to pay; it is a plan frequently adopted by members, and saves much trouble.

Amicus.—In the Exhibition of the Society in Suffolk Street, there is a silver print and a carbon one, both printed by Mr. Pouncy from the same negative. Your own impartial inspection will convince you that Mr. Pouncy's process is deserving of every encouragement.

La Lumière.—You will find much of the information you seek in an octavo volume of near 300 pages, by MM. Barreswil and Davanne, entitled 'Chimie Photographique;' but the advancement of photographic knowledge has been so rapid, that many of the chemicals there enumerated are now in little use. In an article, "Gravure sur métaux divers," Mr. Fox Talbot's first discoveries in photographic engraving are described.

G. C.—Being a member of the Photographic Society of Scotland as well as of London, you are entitled to two copies of the Photographic Journal; the Numbers have been regularly sent by the publishers.

A. B.—Your communication has been forwarded to Mr. Raven, whose pictures you so justly admire. That

gentleman has favoured us with a reply, which is in type, and will appear in our next.

M. B.—We hope in an early Number to print a communication from Mr. Thurston Thompson, giving the best information on the subject.

J. W. M. (*Belfast*) asks for a satisfactory explanation of the cause of his calotype paper turning brown in developing a picture—he appears to have taken much care in the manipulation. We believe it to be a very common cause of failure, but, in our own case, we have so seldom met with the annoyance even in producing some hundreds of negatives, that our experience is limited. In general it depends upon some diffused light in the camera. Too large a diaphragm, or the interior of the camera becoming glossy by use, and thus producing a reflection, or light entering the groove of the slide when pulled up may each cause it. The iodized paper having been prepared by water from an old rain-water butt, and a particular sample of gallic acid, were also causes of failure in two photographic operations. Turner's paper, rather thick, such as is called positive, gives finer pictures than the thin negative which is especially made for that purpose.

R. A. G. complains that, being about to purchase a lens, he is puzzled, by the numerous advertisements of lenses to be sold, which to select, each being said to be superior to the others; and it is suggested by another correspondent, that an impartial report should be given on the relative merits of the different arrangement of lenses.

J. Harding.—Since the receipt of your letter, several trials have been made with a stereoscopic camera with one lens moving in the segment of a circle, and with a camera furnished with a pair of lenses; and there does not appear to be any appreciable difference in the effect produced.

M. P. (*Bristol*).—The invention of Mr. Skaife of Vanburgh House, Blackheath, is the quickest means of exposure of a picture with which we are acquainted.

Photophilus.—In the wax-paper process clouds are often printed in from a second collodion negative taken from nature. We have little confidence in the arrangement of cotton, wool, and other contrivances. As has been said in a former Number of the Journal, the best material with which we are acquainted for the obstruction of light is *not* the yellow glossed calico, which soon fades, but a yellow woollen serge made for theatrical purposes, and procurable at Burnett's, under the Piazza, Covent Garden. With a square of this fixed to any ordinary window, an operating room may at any time be formed.

"*North Country Man.*"—1. Only immerse in the bath such a number of prints as are immediately under your control. If the bath loses its activity, use more gold, but cautiously. 2. The bath, by reheating, acts as well as at the first time, provided the gold has not been exhausted. 4. It is useless to dry the prints in the progress of the process. 5. Papers which contain gelatine or dextrine, both of which are often added to the albumen applied to paper, are apt to become yellow; they do not keep their colour in the same way as paper does which is prepared by albumen alone, especially to which a few drops of acetic acid are added.

H. W. W.—Do not go to the expense of procuring "blue-tinted glass" for the roof of your proposed house. Construct it so as to obtain all the light you can; and with blinds you may always diminish that which you cannot add.

T. Tarrant.—We do not believe you will be successful in taking portraits of children in less than the time you name, five or six seconds. All the instantaneous pictures we have seen are out-door subjects, and done under very favourable circumstances, and with a lens without a diaphragm or with a very large opening.

P. C. H.—You had far better reduce your bath by means of chloride of silver, and save the precipitate for after-fusion, than concern yourself with the restoration of it. There is but a trifling pecuniary loss in the relative value of the chloride and new nitrate of silver.

Captain R. A.—It is not needful to use Mr. Hardwich's bath in a yellow light. It is not advisable, however, to expose any unfixed print to too much daylight; and you should not select your spot of operation too near the window. 2. Use, as a developer, protosulphate of iron, 10 grains; glacial acetic acid, 10 minims; water, 1 ounce.

A Beginner.—You may safely use the process as advised by Mr. Sutton. The quantity of nitric acid is no objection in producing a positive picture.

T. G. K.—1. If protosulphate of iron is kept in brown paper it decomposes. It should be put into a stoppered-bottle; and if a few drops of alcohol are shaken up with it, so as just to wet the surface of the crystal, it will be found that they will retain their bright-green crystallized surface for a very long time. 2. If your bath is poured off clear, you may use it the same as you would a new one.

H. D., *New Year's Gift*, *Anxious to Succeed*, and other Correspondents.—We believe that success attends any of the dry processes, if all the care recommended by the advocates of each particular process be adopted. In the present Exhibition in Suffolk Street is a picture taken by Mr. Rosling according to Taupenot's process, which, in our opinion, is not only the best picture we have seen taken by *any* dry process, but equal to any produced by wet collodion; and Mr. Rosling has very fairly allowed a comparison by placing specimens side by side. We have before us some twenty pictures by Mr. Egbert Moxham of Bruges; and nothing can speak more favourably than these productions do for the success which attends his mode of operation. In the hands of the Rev. Mr. Cleaver, all that can be desired has been obtained by the process he has advocated; and we have all seen the beautiful results of Mr. Fothergill's mode; so we believe that each operator will be most successful with that process which most takes his fancy.

Libra (*Westminster*).—Finely-powdered lampblack, mixed with a hot solution of gelatine, will effectually blacken your brass work; or, if you apply to the varnish-makers in Long Acre, you will be supplied with an article prepared by them for that purpose.

As there is every probability that the question of copyright, as it affects photography, will be speedily considered by the Legislature, it has been thought advisable that the valuable treatise of Mr. Duncan should appear at length in the present Number. The Editor must therefore apologise to several friends for the delay of the insertion of their communications until the forthcoming Number of the 5th of March.

On the present occasion, an unavoidable occurrence has prevented us going to press for some hours later than the usual time.

Letters of inquiry to the Editor can only be answered through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers, Messrs. Taylor and Francis, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 80. MARCH 5, 1859.

The following intelligence has already been conveyed to our readers by the *Court Circular*. Her Majesty the Queen and his Royal Highness the Prince Consort, accompanied by the Princesses Alice and Helena, visited the Photographic Institution in Suffolk-street, on Saturday morning. Her Majesty and his Royal Highness were attended by the Hon. Lucy Kerr, the Hon. Mary Bulteel, Colonel F. H. Seymour, and Captain the Hon. D. de Ros.

Our Patrons were received by the President and Council, to whom, after a lengthened visit, and careful inspection of the works collected, they expressed their high approbation of the progress which had been made in advancing the Art.

The Prince, both on the occasion of the present visit, as well as the former one in January, made suggestions which it is the earnest wish of the Council to carry out; and they have in consequence appointed a committee consisting of the following gentlemen—Mr. Fenton, Mr. Fry, Mr. Kater, and Dr. Diamond—to form a collection to be preserved by the Society, illustrating the progress of the science from its earliest infancy up to its latest improvements.

For this purpose they must rely much on the kind cooperation of the early practisers of our study, and of exhibitors at our former exhibitions; and they wish to impress on contributors, that it is not artistic beauty alone which they value, but any scraps or prints illustrating chemical processes, or those which show the fading and permanence of prints, &c.

They promise that such donations shall be recorded and preserved, and thus form, collectively, what they hope will be a valuable addition to our knowledge, which, as isolated specimens, are comparatively of little value.

Any suggestions or communications on the subject should be addressed to the Secretary, who will be pleased to give personally any information desired.

The Council have also requested the following gentlemen to constitute a Committee on the subject of artistic copyright:—Mr. Fenton, Mr. Foster, Mr. Pollock, Mr. White, and the Secretary.

A Committee of the House of Lords has been formed on this important subject; and its members will immediately proceed with their duties. The subject is most important to Photographers, who, as the law now stands, are wholly unprotected: whatever may be the expense incurred in their production, and although the artist's name may be placed on his works, any one may copy them at any time after their publication, to the most serious injury of the fame and profit of the original artist. Members and those practising the art are requested to give information to the Secretary at once as to the injuries done by piracy of their works, and, if needful, give their evidence before the Lords' Committee, which will commence its sittings in a few days.

With much pleasure we publish without abridgement a translation of a communication which has been received from the French Photographic Society, and ask our countrymen to give their cordial support to the proposed Exhibition.

To the President of the Photographic Society of London.

The French Photographic Society,
No. 11 Rue Drouot, Paris, February 21, 1859.

Mr. President,—We have published in our monthly Bulletin the rules of our Exhibition, which will take place this year in the Palace of

Industry, at the same time as the Exhibition of Paintings, and it will consequently become of great importance.

The French Photographic Society would be highly gratified by the London Society's taking a part in the Exhibition. It has been to them a source of great regret that the Photographic Journals should not have reprinted the announcements of our Exhibition; and we request that you will make known this appeal to the Members of your Society, whose works are giving such importance to the rising art, and are exciting the greatest interest in the public mind. A period of delay of twelve days is granted to foreign artists, who will give notice of their despatch from the present time until the 20th of next March. We request, Mr. President, that you will use all your influence to give this communication the greatest and the most rapid publicity.

The French Photographic Society accepted with the greatest satisfaction the assurance I received personally, last year, of a sincere and lasting coalition. We therefore reckon with confidence upon the goodwill and cooperation of the London Photographic Society upon this important occasion. I have the honour, Sir, to offer you my most polite salutation,

The Agent Secretary, M. Laulerie.

Exhibition of the French Photographic Society.

The French Photographic Society has made arrangements in the Palace of Industry for its third Public Exhibition of Works in every branch of the art, in a special division. The Society invites all Photographers, whether native or foreign, to send contributions, and thinks it necessary to make known all the rules and the conditions adopted by the Committee of Administration.

1st. The opening of the Exhibition will take place in the Palace of Industry on the 1st of April, and it will be closed on the 15th of June following.

2nd. All the despatches must be directed, free of post, to M. Martin Laulerie, Agent Secretary to the Society, No. 11 Rue Drouot, from the 1st to the 15th of March (a period absolutely fixed upon). (A delay of twelve days is granted to foreign artists, who will give notice of their despatches from this time to the 20th of March at the latest.)

3rd. The contributions must be accompanied with a letter indicating the number of works sent, and bearing the signature of the exhibitor.

4th. The exhibitors will find it necessary to protect their works with frames, or with "passe-partout."

5th. All coloured impressions will be excluded from the Exhibition, and such as have been retouched so as in any manner to modify the photographic manipulation by substituting other handling.

6th. It is desirable that the exhibitors should indicate on their separate works, or on the frames, including several impressions, the name and the dwelling-place of the contributor.

7th. It will be absolutely necessary to give a distinct description of the nature of the negative material employed, whether collodion, wet or dry, albumen, paper, either waxed or not, dry or wet, &c.

Any other instructions on the methods of working, negative or positive, will be received with pleasure.

8th. No mention of the price of sale must be made upon the impressions themselves or the frames. The persons who wish to give their own terms must communicate with the Agent Secretary, and indicate their prices; he will make the necessary information known to the public.

9th. No work can be withdrawn by the Exhibitors before the close of the Exhibition.

10th. The works intended for exhibition will be submitted to the preliminary examination of the Jury, who will decide upon their admission or rejection. In the latter case, notice will be immediately given to the parties interested, who will be required to withdraw the subjects that have been rejected in the course of ten days from the time.

11th. The Jury will be composed as follows:—

MM. Comte Olympe Aguado; Bayard; Bertsch; Cousin; Edouard Delessert; Davanne; Léon Foucault, Physician to the Imperial Observatory; Hulot, Associate of the General Engraver of the Mint; Jean Rénaud; Lemaître; Le Comte Léon de Laborde (of the Institute); Le Gray; Adolphe Moreau; Péligot (of the Institute); Robert, Chief Painter in the Imperial Manufactory of Sèvres.

MM. Regnault, of the Institute, President of the Society; Balard, of the Institute, President of the Committee of Administration; Paul Perier, Vice-President of the Committee of Administration; Mailand, General Secretary, will take the right-hand side of the Jury.

12th. The subjects belonging to each exhibitor must be withdrawn, at the latest, during the week following the close of the Exhibition.

Our own Exhibition having now closed, it is needful that exhibitors immediately remove their works. The Crystal Palace Company, however, being desirous of exhibiting, during the summer, a collection which shall well support the character of that Institution, have resolved to grant a free admission to the Palace to all such as shall aid in this undertaking. Professor Delamotte, of King's College, will be happy to communicate and afford information to *all* Photographers who wish their names to appear in this great cause of affording information to the public on the beautiful art of Photography.

Our Photographic friends in Glasgow are about to open an Exhibition in that city during the month of April. We heartily wish them every prosperity in their undertaking. All references should be made to Mr. Barr, the Acting Secretary, 1 Renfield Street, Glasgow.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith. The same proviso extends to communications to the Editor.

PHOTOGRAPHIC SOCIETY, LONDON.

Ordinary General Meeting.

1st March, 1859.

P. le Neve Foster, Esq., V.P., M.A., in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. Bishop tendered a notice of motion, that the Council should send to every Member a printed copy of the accounts of the Society, and a statement of the names in whom the funds of the Society are invested.

The Chairman decided that Mr. Bishop's motion could only be made at an Annual General Meeting of the Society, or at a Special General Meeting convened in pursuance of a requisition signed by twenty Members. The only business of the Ordinary Meetings was simply the discussion of matters connected with the art and practice of Photography. The Chairman stated that if any Member had, or imagined he had, a grievance, and would be kind enough to communicate it in writing to the Council, that body would be most happy to consider it.

Mr. Rippingham, on the part of the Council, denied any desire to conceal the accounts: they were laid before the Members present at an Annual General Meeting, and an extract printed in the Journal of so much as is generally considered sufficient. No application by a Member to the Council to inspect the accounts had been or ever would be made and refused; on the contrary, every information would be most readily afforded by the Council.

The following gentlemen were elected Members of the Society:—

Heath, Alfred T., 36 Camden Street North, Camden Villas Road.

Arabin, Richard, 28 Bruton Street, Berkeley Square.

Feilder, J. H., Nelson Lodge, Trafalgar Square, Brompton, S.W.

Major Cooper, after a few prefatory observations, read the following paper:—

Mr. President and Gentlemen,

It is with some diffidence that I venture before this Society; and my only apology for so doing is my sanguine hope that the Positive Printing Process I am about to offer to your consideration may prove of service to Photography, and that in after years we may look into our portfolios without disappointment. At all events I trust this may be a pioneer to future discoveries, as I feel confident that, when it shall have been investigated by practical chemists, it may with advantage undergo some important improvements and modifications.

I will not occupy your time in detailing a series of experiments which have led to the production of the prints now before you, but I will state that, some years since, "accident" led to my discovery of *Malic Acid* as a photographic agent, the importance of which, in the process I am about to describe, will be duly acknowledged; and from the period of its discovery I have continued its use in my "out-of-doors" process; indeed, I find it indispensable.

I must crave the indulgence of critics for the prints now offered for inspection, as they are the "firstfruits of the process, and my bantling is not yet a week old." I am now compelled to leave home for a short time; otherwise I had hoped to forward better specimens: these are somewhat discoloured in toning.

If we mix a solution of nitrate of silver with a solution of bicarbonate of potass, we obtain a precipitate of carbonate of silver. Now this carbonate is perfectly soluble in *some* of the vegetable acids, especially in malic acid, which in the dark holds it in suspension a considerable time, but which on exposure to bright sunshine immediately precipitates the silver as a brown powder. Citric acid and acetic acid also dissolve the carbonate of silver; but their action is not so decided. Tartaric acid and oxalic acid respectively throw down tartrate and oxalate of silver. Now malate of silver is soluble in boiling water; hence the rationale of this process. Another observation I would make is, that malate of silver (the salt) is insensible to light, or at all events very feebly affected by it: some slips of paper impregnated with the solution of the carbonate of silver have been suspended in the light three or four days; and I can perceive no change.

Malic acid produces but little change upon carbonate of silver which has been exposed to light and blackened,—merely changing the colour, and if the action is long continued, precipitating metallic silver, in fact, developing the picture (see the unmounted scraps): but to produce rich tones the presence of organic matter is required; and albumen appears the most appropriate for the purpose. The carbonate of potass (to which I shall refer presently) dissolves out the size from the English papers; and the starch of the foreign papers appears of little avail. Canson's positive paper was used for the prints now before you.

Formula.

Bicarbonate of potass .. 40 grs.
Distilled water ...... 2 ozs.

Dissolve the whites of two eggs, mix and beat into a froth; when this has liquefied, float the paper upon it in a flat dish, and pin up to dry.

To excite.—A 30-grain solution of nitrate of silver. Expose in a printing-frame: the exposure will be longer than for the chloride of silver papers, as the carbonate of silver appears less sensitive; but a better adjustment of the proportions may perhaps remedy this; the tones are nearly the same. The prints should be rather over-printed, as they appear to suffer in the toning-bath.

The prints when taken from the frame may be floated on distilled water to remove the surplus nitrate of silver, or may at once be floated on a bath of dilute malic acid (1 acid, 2 water), and kept there from ¼ to ¾ of an hour, by which time the whole of the unaltered carbonate of silver will be dissolved; they are then to be well soaked in boiling water to remove the malate of silver and the starch, and afterwards placed for a short time in a weak solution of sesquicarbonate of soda to remove all trace of acid, which appears to cause the rose-coloured tint, as observable in the specimens before you.

The gold bath is essential for producing "good tones," as the prints on emerging from the malic acid bath are of a disagreeable bistre colour.

The bath used was that recommended by Mr. Hardwich in No. 74 of the Society's Journal.

When the prints are sufficiently toned, they must be well soaked in warm water, rinsed, and dried.

I have to apologize to the Society for introducing to it an imperfect process; but, as I stated before, my absence from home prevents my bringing it to maturity; and it is in the hope that some practical chemist will take it in hand and develope it, that I leave it in the hands of this Society.

It will be observed, that no compound of sulphur (saving that trace naturally present in albumen) is employed; and to this element the fading of our proofs is universally attributed.

One word about malic acid (the same acid may be used for many prints; it takes a long time to saturate). It may be objected to on account of its *present* price. The acid I have used for these prints is some "rough" acid I made last year from the berries of the mountain ash. It is abundantly present in vegetables; and cider would be a fruitful source in the absence of other means. Should there be a "call for it," I have no doubt it would become very cheap.

W. Cooper Cooper.

Note.—Malic acid must not contain tartaric acid, lead, nor colouring matter.

Malic acid does not precipitate bright metallic silver from the nitrate solution when exposed to light, as stated by Parkes in 'Chemical Essays,' but a bright highly reflective crystalline powder, so brilliant that in falling it might easily be mistaken for silver spangles. This white crystalline powder is perfectly dissolved in boiling water.

Albuminized Paper.

Bicarbonate of potass, 60 grs.
Water, 1 oz.
White of 4 eggs.

Colour of proofs, when finished,
Rose colour,
Salmon colour,
Violet colour,

possibly affected by impure malic acid, containing possibly tartaric acid: the crust on the bottles, like port-wine crust, tends to this idea. No lead was precipitated by sulphuric acid or iodide of potassium.

[Major Cooper exhibited several prints and specimens illustrative of the process he described.]

Mr. Hardwich was exceedingly glad of these opportunities for the discussion of new printing processes. It struck him, however, that there would be a difficulty in Major Cooper's, because, unless he employed absolutely pure bicarbonate of potash or carbonate of soda, he would not secure the absence of chloride. If albuminized paper were used, albuminate of silver would be produced, and simple malic acid would not then fix the picture. He thought all processes for fixing albuminized paper without the use of hyposulphite of soda defective. He had tried ammonia, and did not perfectly succeed in fixing a picture upon albuminized

paper, although he did succeed upon plain paper. Some time since he took the trouble to prepare a sample of malic acid, and found it liable to be contaminated with other substances, such as oxalic acid, &c.; although he had no doubt, as Major Cooper had remarked, that, if there were to be a demand for it, it could be procured at a reasonable price. He (Mr. Hardwich) was not prepared to understand that the reduction by light, by the Major's process, would be sufficiently rapid; for although there was a certain amount of sensibility in the carbonate of silver, especially when the amount of free nitrate of silver was large, still the process must be slow, and the prints rather wanting in vigour. He (Mr. Hardwich) usually found that without the aid of chloride of silver he could not obtain a rapid and intense reduction of the parts exposed to the sun's rays, and therefore did not at present imagine that Major Cooper's process could be successfully carried out as described.

Major COOPER called attention to the first part of the process, viz. the floating in distilled water to prevent the formation of any chlorides in the paper. He admitted his printing was rather slower than the usual process, although no one of the prints upon the Society's table had been exposed more than an hour or an hour and a half.

Mr. HANNAFORD handed to the Chairman some slips, as bearing upon some of the remarks made by Mr. Hardwich; and stated that they were procured by the ordinary printing process, with the exception of the omission of the salt, and consequently there was an absence of chloride.

Mr. SHADBOLT stated that Mr. Hannaford had overlooked the simple fact that no paper could be obtained which was perfectly free of chloride, and that, consequently, a chloride of silver must be formed. Mr. Hardwich was a little too fearful that ammonia would not get out the chloride. He (Mr. S.), when he was a member of the Printing Committee, made a few experiments, and went to the extent of soaking a paper, fixed in this way, in a weak solution of hydrosulphate of ammonia. The thing was to be done; and if it were a *sine qua non* to get rid of hyposulphite of soda, the means were thus known.

Mr. HARDWICH stated that it was not the chloride of silver, but the oxide of silver which he feared would be left in the paper—oxide of silver associated with the albumen.

Mr. SHADBOLT begged to be allowed to make the further remark, that Major Cooper was a little out in his chemistry when he remarked that carbonate of silver is soluble in malic acid. It was not that the carbonate of silver was soluble, but simply that the malic acid displaced the carbonic acid, and hence the malate of silver.

The thanks of the Meeting were then accorded to Major Cooper.

The SECRETARY then read the following letter from Mr. Hardwich:—

To the Secretary of the Photographic Society.

DEAR SIR,—May I ask you to oblige me by reading the accompanying letter at the next Monthly Meeting of the Society? The object which we all have in view is to promote the interests of the Art, and to encourage a friendly tone of feeling amongst the members. Now, it appears to me that one very effectual means of doing so, and of giving a social character to our proceedings, is the occasional appointment of Committees for the purpose of examining matters of common interest, and reporting upon them to the Society. Our friends at Manchester have lately set us an example, by combining together to test the merits of the various dry and preservative processes, and their published report is quite satisfactory and unprejudiced. It is not by any means my wish to obtrude myself unnecessarily upon the notice of the Society, but having now for the space of two years been engaged upon a subject which I believe to be of the first importance to Photography, viz. the preparation of a uniformly good collodion, I am naturally desirous to give all possible publicity to the result, by offering it for experimental trial.

Our Society includes amongst its members some of the most skilful photographers in this or any other country, and the plan which I propose is, that several of these gentlemen, each eminent in his particular department, shall combine and report upon the formula which I will do myself the honour of laying before them. The question will present some difficulties, because it is with collodion as with photographic lenses—in the attempt to overcome one form of error, another, of an opposite kind, is introduced. Your Committee, therefore, will have to specify the qualities which, in their judgment, are most really indispensable.

To execute this office in a satisfactory manner will require time, because a variety of samples of the collodion must be tested in order to ascertain how far it is liable to vary in quality. It must also be used under different conditions of light and temperature; so that from the date of the formation of the Committee, at least six months would elapse before they could be in a condition to present their report. Supposing the time fixed for the report, therefore, to be the first Meeting of the Society after the summer recess, a paper will immediately afterwards be read containing a particular account of the manufacture of the collodion, with all the necessary precautions and sources of failure as far as ascertained.

Now, it is for the Members themselves to decide whether or not this suggestion shall be carried out; but in their deliberations let me ask them to reflect for an instant, that although photographers who are fortunate enough to be resident in the metropolis during a part of the year may be conversant with what is doing in the Art, yet that there are many others living at a distance who naturally look to the Societies and the Journals to guide them, and when they see the names of successful exhibitors, they are glad to know the mode of working

which the experience of these gentlemen leads them to prefer.

It has been objected by some, that Photographers when associated together rarely or ever arrive at any decision; but this was not the case with the "Printing Committee" appointed by your Society, nor was it so with the Manchester Commission before referred to. With such preliminary experience, therefore, we have no reason to be doubtful as to the success of this project.

But it may, perhaps, be urged that we cannot hope to force the adoption of any one process for a material like collodion, and that each operator will continue to employ that which suits him the best. This may be partly true; but we hope to be able to show a great preponderance of advantages on the side of one particular formula, and to prove at the same time that others, although successful with individuals, are not to be depended on commercially. It would weaken the force of my appeal to the Society if I were to go into particulars at this time; but I may simply remark that, inasmuch as photographic collodion is often exported to India and other hot climates, *stability* is an important point, and hence no preparation will receive the approval of the Committee which shows any manifest tendency to spontaneous change. Neither will materials of a variable quality, such as paper, rags, &c., be employed, since they cannot uniformly be depended upon. All these questions have been carefully considered by me, and I trust I shall not be found to have placed myself in a false position by offering to the Society a process which in reality is not worth its acceptance.

FREDERICK HARDWICH.

[The SECRETARY stated that the Council had considered Mr. Hardwich's proposition, and resolved that a Committee of the Society should be appointed to examine and report on the various formulæ for making collodion, and that Members of the Society and makers of collodion be invited to send samples of collodion, such samples to be accompanied by a statement of the manner of their manufacture.]

The SECRETARY then read a letter from Mr. Penney of Cheltenham, accompanying some specimens, which were exhibited, of Carbon Printing, and prints produced with sepia, lake, and other pigments, being modifications of Mr. Pouncy's process, which—

The CHAIRMAN stated to be very interesting specimens, as exhibiting the progress of this new mode of printing.

Mr. FRITH had tried the carbon printing, as had several of his friends, without any great success, and they had all given it up as comparatively hopeless for general purposes.

Mr. SHADBOLT, reverting to the first letter read by the Secretary, had not before heard of Mr. Hardwich's suggestion, but gave his first impressions. The French Photographic Secretary had long been in the habit of sending to a Sub-committee certain questions upon which it was thought advisable to pronounce an opinion, giving the names of the members of the Sub-committee, and that system had worked well. If he did not misunderstand Mr. Hardwich's suggestion, it was that a Committee should be formed for the purpose of testing collodion by different manufacturers who were willing to subject their collodion to the test and give their formulæ to the Committee: that appeared likely to do good to the photographic art, as it would clear up several points connected with collodion. For instance, several persons entertained the opinion that collodion containing a great mass was most sensitive, while others considered that collodion, in order to be extremely sensitive, must be exceedingly thin; and it may turn out that both parties are right. There was another very great difference of opinion existing, of considerable importance now that the dry process was, as it were, upon its trial; and the difference arose upon the question whether the collodion made at a high temperature, or that which was made at a low temperature, was the best; and he had found opinions pretty nearly equally balanced: he had tried both, and had been, alternately, inclined to consider first the one and then the other the best. Mr. Shadbolt's object in calling attention to this was, because it very frequently went abroad that if a Committee were formed to test any particular thing, it was apt to be thought that what was submitted to the Society must of necessity be tested. The Society would confine itself to testing those things which it was requested to test.

Mr. HARDWICH confessed he did not precisely understand Mr. Shadbolt's observations; but if he said that the Committee should examine a great number of specimens of collodion that might be sent to them, he thought that it would be utterly impossible for the Committee to do the work. He (Mr. Hardwich) had experimented upon collodion for two years, and had collected a great mass of information. By degrees, and with the assistance of many friends, he had arrived at one formula, which was on the whole a working formula. He did not think it an unfair proceeding to ask the Society, as a Committee of practical men, to examine it, and to say whether it will do what it is professed to do. He would withhold nothing, and would describe how it was to be made, and what precautions were to be used to secure the results. As he had made this offer to the Society, he thought that he was entitled to the commission to examine this collodion alone. By the collodion he meant principally the pyroxyline, and did not refer to the iodide or bromide. To prepare good pyroxyline with certainty was one of the most complex chemical problems, as there were many peculiar changes which might take place in its manufacture.

The CHAIRMAN stated that he was not aware that Mr. Hardwich entertained any objection to the form of resolution proposed by the Council. The Committee would be formed for the purpose of considering any collodions, or formulæ for making them, which individuals and manufacturers may desire to lay before it—not confining themselves to the one collodion of Mr. Hardwich, but taking a broader basis of operations. Of course the Committee must take upon themselves to determine the time in which they shall complete their inquiries.

Mr. SHADBOLT stated that it was in consequence of the resolution of the Council and the suggestions of Mr. Hardwich not quite tallying, that he had spoken upon the subject.

Mr. SEBASTIAN DAVIS stated that he had within the last week carefully examined the formulæ given for the manufacture of pyroxyline in the last edition of

Mr. Hardwich's Manual, and found that with the materials he had used, instead of obtaining a satisfactory pyroxyline at the temperature stated, that the cotton dissolved more like lump-sugar than cotton; and it appeared that the recommended quantity of oil of vitriol was decidedly in excess. He merely stated this to show why it was desirable that when gentlemen communicate details they should have an opportunity of defending themselves. He knew full well that many communications had been made to the Society by gentlemen, and other gentlemen with a considerable amount of photographic knowledge had not succeeded in following out their views, although they appeared to be exceedingly explicit and clear; therefore he, for one, would advocate the appointment of a working Committee to test the particular formula laid before the meeting. Under those circumstances there must be a full and clear and precise description of the whole process from the commencement to the end, so that any other operator shall be able to succeed in the same manner, because it was known that science was based upon exact principles, and all must arrive at the same result.

Mr. Hughes rose to call attention to the important question involved. Over and over again complaints had been made as to the inutility of Societies like this, because they had not undertaken such duties as that now proposed. It appeared that the question involved in Mr. Hardwich's proposition was this—Was it desirable from time to time, when any particular novelty was presented, to investigate the merits of that novelty, and pronounce an opinion upon it? Mr. Hardwich thought he had a collodion which would settle the much-vexed question as to a definite formula for this usually unstable substance, and was willing to communicate it to the world, with all his experience, upon the condition that the Society will pronounce an opinion upon it. If he, Mr. Hughes, understood Mr. Hardwich rightly, he would like this Committee to test the collodion for all the various contingencies for which collodion is used—for interiors, for exteriors, for still life, and for portraits; while the resolution of the Council is, that a Committee be appointed to investigate the merits of all collodions made by every one, upon the condition that their formulæ be published. If Mr. Hardwich's proposition did not go to that extent, it fell to the ground, and a new one is taken up, which, it appeared, the Council were not invited to entertain. There was a broad principle involved in the issue on this particular point.

Mr. Rippingham stated that Mr. Hardwich was himself one of the Council, was present, and did not dissent from the resolution with the extending terms.

Mr. Hardwich said he had no possible objection to the alteration as proposed, if the Committee could do the work, and should be most happy to modify the original proposition to bring it in accord with the resolution. With reference to the remarks of Mr. Davis, he should be happy to reply. Taking first the cotton, it was known that there were twenty-six varieties of cotton: he used the best and finest he could get, and this did not dissolve in the acid. Possibly a common quality of cotton would dissolve in such an acid. Certainly flax might dissolve in an acid mixture which did not dissolve cotton, and so might the white China grass. Perhaps it would be found eventually that he had not satisfactorily answered every question with reference to collodion, but he believed that he was prepared to publish more than had ever been published up to the present time, and that he would not be doing justice to himself if he refrained from bringing it forward.

Mr. Hughes rose in explanation. He had thought that there was an antagonism between the resolution of the Council and the proposal of Mr. Hardwich, and concluded by asking the Council to name the Committee.

The Chairman stated that there had not been time to do so at the meeting of the Council previous to this meeting, but that would be done at their next meeting.

Mr. Sebastian Davis thought he should be scarcely in order in going into the chemical composition of pyroxyline, but might do Mr. Hardwich the justice to say, that in the following page of his book he distinctly asserts that the formula cannot always be depended upon in minute particulars, but that the strength of the acid, &c. was liable to variation.

The Chairman stated that Lord Lyndhurst had procured the appointment of a Committee in the House of Lords upon the subject of artistic copyright, and the Council of the Society had appointed a Committee to attend, and lay evidence before the House of Lords.

Her Majesty, the Prince Consort, and two of the Princesses visited the Exhibition a few days ago. Her Majesty expressed great gratification at the success; and His Royal Highness the Prince made a suggestion to the Society, which the Chairman thought a valuable one, and the duty of the Society to undertake—namely, to get together a complete and satisfactory record of what has hitherto been done in Photography, and to form a collection of early photographs in order to show the progress which has been made from the beginning to the present time. Our President, to whom the communication was made, had earnestly supported the recommendation, and a Committee had been formed to carry out these views. For the future there could be no difficulty; but with regard to the past, the Society must rely upon its members to send in such specimens as will illustrate the progress of Photography, and the Society will place them in safe keeping.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

A Meeting of the Blackheath Photographic Society was held, February 21, 1859, at the Golf Club House,—the President, J. Glaisher, Esq., F.R.S., in the chair.

The Minutes of the last Meeting having been read and confirmed,

The President called the attention of the Members to a Soirée which it was in contemplation to hold.

Mr. Harding moved, and Mr. Knill seconded "That such Soirée be held."

A Committee was proposed by Mr. Wood, and seconded by Mr. Ledger, for the furtherance of this matter, consisting of the President, Vice-President, Treasurer, Secretaries, and Messrs. Bennoch and Wood.

The President read a letter from F. Haes, Esq., dated Sydney, detailing some facts in reference to the deterioration of dry collodion plates taken by him abroad.

Some photographs of Linton and North Devon were exhibited by the President.

Mr. Wood exhibited some photographs from views in the South of France.

Mr. Knill some photographs from frescoes in the Campo Santo, Pisa.

William Porter Knightley was duly elected a Member of the Society.

The Meeting then adjourned.

PHOTOGRAPHIC SOCIETY OF IRELAND.

This Society met in the School of Art of the Royal Dublin Society, on Friday evening, the 24th February,—Gilbert Sanders, Esq., President, in the Chair.

The Minutes of the last Meeting were read, signed, and confirmed; and the Auditors' accounts of the Society for the past year were presented by the Treasurer, and passed.

The following Officers were then elected by ballot for the ensuing year:—

John Bayly, Esq., J. P. and D. L., *President*. Sir J. Joscelyn Coghill, Bart., Captain Penny, *Vice-Presidents*. *Council*.—William Allen, T. M. Brownrigg, Arthur Barlow, Thos. Grubb, Professor Gluckman, William Hodges, Edward Roper, Gilbert Sanders, Frederick Sanders, John Shaw Smith, Esqrs. Samuel Bewly, jun., Esq., *Treasurer*. Henry Thomas Vickers, Esq., *Hon. Sec.*

The following were appointed as a Committee to adjudge the Prizes for Photographs:—William Broras, Esq., R.H.A.; Francis Brady, Esq.; Henry T. Vickers, Esq.

The President having vacated the chair, it was taken by Francis Brady, Esq., and the Meeting was continued in connexion with the Section of Fine Arts of the Royal Dublin Society.

George F. Mulvaney, Esq., read a paper "On the Influence of Art-Unions."

Henry T. Vickers, Esq., read a paper "On the Production of Instantaneous Photographs."

He stated that he would give an account of some experiments made to ascertain the exact amount of time in which so-called instantaneous photographs can be taken. He exhibited two instruments made for uncovering and covering the lens, so constructed that the uncovering commenced at the centre, and the covering ended there also; the peculiarity being, that the two plates which effected it were connected with each other, and must act simultaneously. He exhibited a clock, to the dial of which a hand was fixed, having a bright silvered head at the centre, and another at the circumference. The hand was made to revolve uniformly, once in a second; and he exhibited a photograph taken of it while so in motion, which proved that the time occupied from the commencement to the end of the exposure was but the tenth part of a second, and that each part of the photographic track of the luminous head at the circumference was caused by the action of light during $\frac{1}{100}$th part of a second. He detailed the many difficulties and disappointments to be met with in taking instantaneous photographs, some of which, taken with a three-inch portrait combination, he exhibited; and mentioned that the most sensitive collodion which he had ever used was iodized with iodide of ammonium, and at the time of iodizing, a small bit of fresh-burnt lime was added, which had the effect of abstracting the water, and forming iodide of calcium with the free iodine; but he stated that he preferred using an ordinary sensitive collodion, and developing in the first instance with an iron developer.

Several of Mr. Pretsch's new photo-galvanographs were exhibited by Mr. Sanders (the late President), and much admired.

The Camera-lens in a Telescope.—Testing a lens.—Depth of focus.

(*From* Professor Petzval's *original paper.*)

[Abridged and translated by Mr. Paul Pretsch.]

This new lens was brought out more than a year ago, and we are sure that no production of the kind has ever before caused so much excitement and demonstration of feeling amongst those interested in the matter. Nevertheless the lens is at present used to a greater or less extent in all Europe, and doubtless will soon be generally applied wherever the art of photography is practised.

No sooner was it published than it was imitated, and the imitations imitated again. These imitations have been even more extensively sold than the original lenses, although very many of the latter have been issued, and on account of the great care and attention required in their manufacture it has been difficult to execute all the orders received.

The circumstances above alluded to have caused much annoyance, and have rendered it necessary to provide a means of proving and testing the various productions forced upon the public. The usual mode of testing a lens is by taking pictures with it; this is, no doubt, a very practical mode, but it is not scientifically accurate.

Professor Petzval tests all the lenses of M. Dietzler the optician, but not by taking pictures with them. We can sometimes take a

good photograph with a bad lens, and with a good lens we may obtain a faulty picture. Conclusions may be drawn in either case, but not with certainty or precision.

Take, for instance, the case of the magnificent architectural views from Italy or France; are they a proof that the artist worked with a superior lens? Not at all. The sharpness may be the consequence of using a small diaphragm in an excellent light and with a long exposure. Or, on the other hand, if we see a photographic picture with crooked steeples, is it the lens which has done this? Not always; in many instances the fault is due to the photographer himself, or to his bad camera.

It would be easy enough to mention here many other similar cases, but it will suffice to state that, in testing a photographic lens by the above practical mode, we commit the fault of confounding together the quality of the lens, chemicals, light, position, camera, skill of photographer, &c.; and the consequence is, that we are uncertain to which of these various causes the result is really due. It is, therefore, advisable to point out some more simple and easy mode of proceeding.

Science, armed with implements of her own, is enabled to test with facility and certainty every optical production, whether it be a telescope, microscope, or camera lens, and to define and express in numbers the exact efficiency of any such instrument. Probably everybody who uses a photographic instrument is accustomed to look through a telescope; therefore take, as one of the most suitable modes of testing a lens, the proof by the telescope. It can be accomplished either by fixing the lens in the camera and directing it to any object with defined lines, such, for instance, as a printed sheet or engraving, and examining the image with the tube of the telescope having the eyepiece in it (you must not take the image as it appears on the ground glass, which is generally too coarse, but the image reflected in the air); or, you may bring the cell with the compound lens in the tubus itself, taking care to have it a little longer than the focus of the lens; and this latter mode also gives to the instrument an additional application.

The image of the new compound lens is so sharp, that it allows, at least, the use of a microscope of ½-inch focus; therefore it is especially fit for a telescope. It renders, for instance, with an aperture of 3 inches, a tubus or telescope terrestrially or astronomically, by an enlargement of 40 times. The tubus at present before your eyes has a terrestrial eyepiece with 60 times magnifying power. But an astronomical eyepiece is preferable, because it is true, and does not allow any mistake. When using a terrestrial eyepiece we can make effective a larger or smaller portion of the lens by the application of small stops, and can therefore influence the degree of sharpness. The application of a diaphragm on the point of view of an astronomical eyepiece being fixed, all mistakes are in consequence prevented. Any amateur of photography who is anxious to possess a superior instrument ought to obtain also the arrangement of a telescope. By doing so, he will secure not only the possession of an elegant tubus of considerable sharpness and superior intensity of light, but will also become protected against the troublesome *chemical focus*, because it is utterly impossible that any lens which possesses this fault in a considerable degree can stand the test of the telescope.

The above-named test proves, without doubt, the various good properties of a lens, viz. sharpness of picture, therefore absence of the spherical as well as chromatic aberration, and also of the chemical focus. We have such a telescope with 3-inch aperture; but Professor Petzval possesses some with 2- and 5-inch aperture, which he constantly uses for testing the lenses manufactured by M. Dietzler.

Having ascertained that any camera-lens is capable of standing the test of the telescope, then it is not very difficult to prove also its remaining good qualities. The sharpness of the picture ought not to decrease too much from the centre to the edges of the field of view, for instance, with a lens of 3 inches on a surface of 16 inches. This is tested in the camera obscura by *focusing* any suitable object, such, for instance, as black lettering on a white ground, or the dial of a church-clock, first in the centre, and then bringing the same object on the edge of the ground glass, and focusing again. Finally, it will be necessary to determine whether the straight lines of any object become crooked, which is easily enough ascertained in the interior of a room, by reproducing on the ground glass an image of the window, or any piece of furniture with straight lines.

It is, therefore, not necessary to take a photograph for the purpose of becoming convinced of the good qualities of a lens. Even the *intensity of light* we can better ascertain by taking the aperture of the second constituent lens, and the focal length of the system. There is only one photographic test which proves undeniably the good quality of a lens, viz. the successful copying of a map on a diminished scale, the fifth part of the original for instance. Will such a copy admit of examination with a microscope of five times magnifying power, and exhibit all the details of the original? especially will the fine and

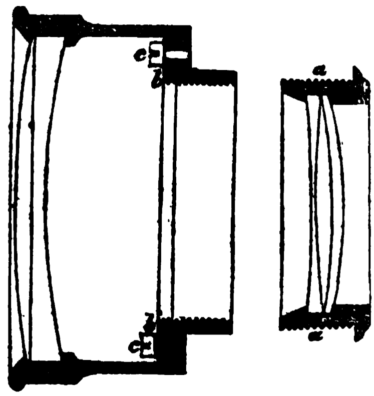
broad strokes of the lettering appear equally sharp, the white portion perfectly white, and all straight lines remaining straight?—if so, everything is perfect—the lens, the camera, the chemicals, and the photographer. Proofs by photography, other than this, may give a partial evidence, but they do not prove the utmost perfection of a lens, considered as an optical production.

The telescope in question has its lenses mounted in a peculiar way, which must be explained. It is, in fact, a dialytic telescope, with this difference only, that both of the separated lenses are achromats. Therefore it possesses also, like the other dialyts, the well-known perceptibility for changes of the distance between the two constituent lenses, which is more than that for small variations in the curvatures. A hundredth part of an inch is sufficient for the purpose of altering considerably the quality of the image. It has been found, therefore, advisable to arrange the distance between the two constituent lenses of the object-glass of the dialytic telescopes in such a way as to admit of adjustment, so that for each eyepiece the suitable distance or space between the lenses can be obtained. For the same reason it became necessary, in this new dialytic telescope, to use some contrivance for the purpose of approximating or withdrawing the second constituent lens. There is an important difference, however, in the two cases.

When the space between the lenses is altered in an ordinary dialytic telescope, the *chromatic* quality of the image is affected, but in the new instrument only the *spherical* aberrations. This difference depends upon the fact that both lenses of the old dialytic telescope are unachromatic, but in the new one they are achromatic.

The shifting of the lenses is usually effected by a tube and pinion, but in this instance there was no room for them, because the second lens is almost as large as the first; moreover, on account of the great susceptibility of the new object-glass, a very accurate direction is required, so as not to alter the central position of the lens. Professor Petzval has, therefore, applied the following contrivance, which has answered well; but should any one find out something better, he would be much obliged for the communication.

The second constituent lens possesses its own mountings, *a a*, which have externally a thread fitted for a cell or ferrule screw on the mountings of the first constituent lens. A thin ring, *b b*, is added in continuation of the cell or mother screw; this ring has six screws, *c c* (only one of each description to be seen on the diagram)—three of them serving to fix the ring to the cell, but the others being in the ring itself, and working against the cell, thus serv-



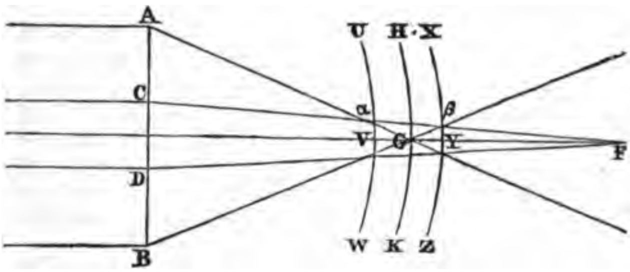
ing the purpose of keeping the thin ring separated from the cell. In making these mountings, the above-named ring is tightly screwed on to the cell by means of the first three screws, thus forming almost one piece with it, and whilst it is in this position the threads of the mother screw are cut in the inside of the cell. Then the first three screws ought to be loosened a little, and the other three slightly adjusted, so as to obtain a small, almost inappreciable, space between the ring and the cell, which space can be increased or decreased as required. By these means the mountings of the second constituent lens are kept fixed, so as to prevent any disturbance of the central position of the lens. The ring ought not to be too strong, but rather thin and elastic, to make the movement exact and easy.

Therefore, if any alteration of the distance between the two constituent lenses be required, the three straining screws ought to be loosened, the second lens screwed forwards or backwards, and then the same three screws tightened again. This contrivance answers well for lenses from 2- to 5-inch aperture, but it has the disadvantage of being only suitable for persons who are well experienced in the use of optical instruments, because it is exceedingly easy, by an unfortunate manipulation of the screw-driver, to disturb the exact position of the glass, and so to convert a good lens into a very bad one; neither can this be rectified without much trouble. Therefore we have not as yet ventured to apply this contrivance to all the photographic lenses, but only to those which may serve for telescopes. Nevertheless, this method of increasing or decreasing the space between the two constituent lenses possesses some advantages, not only for those who work with telescopes, but also for the photographer. The advantages which can thus be obtained may here be briefly indicated.

If it be intended to use this compound lens as an object-glass in a telescope, the operator is enabled to accommodate it to his eye, and to his eyepieces, until he has obtained its best performance; whilst, on the other hand, in the case of a single achromatic lens, or object-glass, we have only a rigid motionless body, not admitting of any adjustment.

But this contrivance is also of importance to the photographer in another way, which cannot, perhaps, be briefly explained in a satisfactory manner, but will, nevertheless, be easily intelligible to the practical photographer,—that is to say, we can produce by these means more or less "depth of focus," and can also influence in other respects the quality of the image. This assertion may appear puzzling to men of science, because "focus" is generally considered the point of union of such of the parallel pencils of rays as are nearest to the axis. What then is meant by a "deep point"? we will try and explain briefly.

Depth of focus resides in a lens which has a considerable spherical aberration, surpassing very much the chromatic aberration. An English gentleman has defined this expression in a practical mode, by saying, "depth of focus is no real focus at all." This definition is excellent; but it has two weak points. First, it may mean something else, because the chemical focus is also "no real focus at all;" and secondly it is a negative reply, because it says what it is not, without saying also what it *is*. We will give our definition with pleasure, and the more so because the origin of the expression is a remarkable instance of how every-day life—in spite of the strict logic of science—can falsify, by its overwhelming omnipotence, the notions of science, and form its own language—a peculiar sort of technicality or "jargon," fit only to darken the intellects of the artisan. However, the best mode of attacking a bad spirit is, by calling it by its right name. Therefore, we may say that both chemical focus and depth of focus are imperfections of a lens; adding also, that we perceive no possible advantage in the first, whilst the latter is evidently an evil, although it has some good properties, and may sometimes be made use of with advantage.



Suppose we have a lens which is perfectly achromatic, but which possesses a considerable surplus of spherical aberration. There is a system of rays parallel to the axis; those incident in A and B might become united in G. The others belonging to the same pencil of rays, will not be united in G; and there may be some of them, perhaps, incident in C and D, which answer to the utmost spherical aberration, and whose union will be accomplished, perhaps, in F. Suppose now we place a screen in G for the purpose of receiving the image. The evidence of eyesight will teach us that we can move the screen as we like—instead of keeping it steady at G—to any other point of the axis of the system of lenses, if it is only kept between α and β; and only on the one side beyond α, and on the other side beyond β, can we observe a perceptible deterioration of the image.

This can be imagined not only of the central, but also of every other pencil of rays which forms an angle to the axis; therefore a lens, in possession of a considerable spherical aberration, reproduces the picture not in a curved surface—like another compound lens free of any aberration—but filling a certain space. This space is confined between the surfaces UVW and XYZ, between which we can imagine many even and curved surfaces, all of them rendering surfaces of pictures.

The advantage which the photographer can derive from such a peculiarity of the lens is, in fact, not altogether unimportant. It reproduces a flat picture from an even or carved object; it represents objects of near and far distances with the same sharpness, or more correctly perhaps, indistinctness; special care in focusing is not necessary. Therefore there are all the requisites of an ideal perfectness, only the sharpness is wanted, and also the intensity of light, because such a condition can only exist when the pencils of rays form a very acute angle. This is indeed, so far as we can judge, what is meant by "depth of focus." It has at least the advantage of convenience, especially

if the lenses possess small apertures; and it is the property of the reversed telescope lens, fitted with suitable diaphragms, which was used originally by Daguerre, and which owes its continued application to this "depth of focus." This "deep focus," therefore, although an imperfectness, has some good consequences, when great sharpness is not wanted; especially is it able to render, under favourable circumstances, a uniform condition of the picture. But we are perfectly unable to discover any good quality in the "chemical focus."

We protest against any supposition of the new compound lens having either a chemical focus or a depth of focus. However, by an alteration of the distance between the two constituent lenses, we can obtain easily enough a certain amount of spherical aberration, the achromatism remaining perfect; and inasmuch as the depth of focus consists in the preponderance of spherical aberration, therefore every photographic artist, who studies attentively the new compound lens and its peculiarities, will be enabled, by altering this distance, to obtain as much depth of focus as he can reasonably desire. For the purpose of making this more intelligible, the following details may be serviceable.

If the distance between the two constituent lenses is diminished, the spherical aberration increases in a rapid gradation, and there appear also the following remarkable effects upon the picture, namely:—

1st. The curvature of the picture becomes less, but on its edges appears a peculiar description of spherical aberration, which has been fully explained in Professor Petzval's dioptrical researches, an English translation of which has been published in the 'Philosophical Magazine' for January. It is distinguished by the circumstance that the horizontal and vertical lines of one and the same picture appear separated—that is to say, the sharpness of each appears in a different distance of the screen from the object. We can render this nearly undiscernible by the use of smaller diaphragms, and we then obtain an almost even or flat picture.

2nd. The straight lines on the edges of the picture appear a little curved, and in such a way that the convexity of the curvature is turned towards the centre. Therefore the imitation lenses, which have called forth this observation in some published papers, had most probably uncorrected spherical aberration.

However, if the distance between the two constituent lenses be too much increased, the contrary case happens—the concavity of the curved lines is turned towards the centre.

The use of a telescope for choosing a lens is therefore strongly recommended to photographers;—many of them being in the predicament of a marksman, who is accustomed to handle only an ordinary gun, and suddenly finds himself in possession of a perfect rifle. He will at first experience some difficulty in using it.

Considering that this new compound lens will take its place amongst telescopes, it will be expected that it should have a name; but Professor Petzval cannot venture on this at present. "The Photographic Dialyt" would be such a name, capable of expressing pretty nearly the future destination of this optical production. However, something may still be wanted, and he only wishes that he may be enabled to complete his invention by such additions, that the multifarious applications of which it is capable may be known.

Although he flatters himself that at some future time we may find such an instrument in use as a telescope at our observatories, since it has some advantages,—nevertheless he does not presume to say that it surpasses the best instruments of that kind, which moreover is out of the question, since its achromatism is of a different kind from the achromatism of the best telescopes. In the latter instance, the compensation of the chromatic aberration is obtained by the method of the smallest sums of quadrats; but in the lenses for photography the same is achieved in a far better mode by means of the numeric equal maxima and minima of the aberrations, so as to prevent, as far as possible, any separation of the optical and chemical focus.

The aim of Professor Petzval's warm efforts in carrying out this instrument has been, to render some substantial services to those admirers of science who are able to solve easily the simple problems of mathematical and optical formulæ, and who, being accustomed to penetrate by their intellect the creation or production of their hands, are to be considered as the mediators between strict science and practical life, and are therefore the bearers of intelligence, and of progress in art.

On the Compounds which Iodide of Silver forms with other Salts of the same metal.

To the Editor of the Photographic Journal.

Bagnères de Bigorre,
January 31, 1859.

Sir,—In the last Number of the Photographic Journal Mr. Hardwich raised the question of the compounds which iodide of silver is capable of forming with other salts of the same metal. This question is one which he justly

question of great importance, and one which has engaged my attention as well as his own, especially in dry-collodion processes.

It is, I believe, allowed by many, though not by all, that there does exist a compound of the iodide with the nitrate of silver; but the various forms and properties of this substance, and the important part it plays in photography, have been little, if at all, separately examined, and I now propose to mention a few facts and considerations with regard to it.

We have the iodo-nitrate of silver, if we may so call it, under three different forms:—First, in solution, when we dissolve iodide of silver in the negative nitrate bath; secondly, in the amorphous form, as it appears on the surface of the collodion plate; and, thirdly, it may be obtained in the crystalline form by adding recently precipitated iodide of silver to a nearly saturated solution of silver nitrate, when it will be found that much of the iodide, which at first dissolves, re-precipitates as a crystalline iodo-nitrate, and that even the excess of iodide which remains undissolved slowly becomes converted into a similar crystalline deposit. This crystalline iodo-nitrate is sensitive to light, like the amorphous deposit on the sensitized plate, and it may be dried without losing its crystalline form; but as soon as it is touched by water it decomposes, loses its silver nitrate, and by sufficiently prolonged washing becomes reconverted into silver iodide, as insensible to light as it was before being placed in contact with the silver nitrate. The amorphous deposit on the plate is subject to exactly the same laws, only it is rather more sensitive than the crystalline iodo-nitrate, a difference probably attributable to the crystalline form of the latter; but by washing it loses, like it, its combined nitrate, and becomes equally insensible to light, while at the same time it passes from a straw-yellow to pale primrose.

Now, what results from the consideration of the above facts?* Simply, that by their means we are enabled to explain several of the rules which practice has from time to time given to photography. As the iodide of silver, when placed in a concentrated solution of silver nitrate, first dissolves and then re-precipitates as crystalline iodo-nitrate, we can understand why it is that in practice it is found inconvenient to employ a bath of nitrate of silver over a certain strength, as it infallibly destroys the sensitive film; and for a similar reason we should not allow the nitrate bath to concentrate by evaporation and dry on the plate. Again, we destroy the sensibility of the plate by prolonged washing, since we thus decompose the iodo-nitrate upon its surface, as above described; and, lastly, when we wish to preserve the sensibility of a collodion plate, we wash it with a glutinous or syrupy liquid, which, by enclosing each atom of the iodo-nitrate, protects it from decomposition while we are getting rid of the superfluous nitrate †.

Is it not also highly probable that the accelerating action of many salts, as acetates, nitrates, fluorides, &c., the use of which has been so much questioned by some, and recommended by others, may be attributable to the formation of iodo-acetate, iodo-fluoride, &c. of silver? Iodide of silver is not the only salt of this metal which possesses the property of retaining the nitrate in combination. The chloride and bromide have the same property, though in a less degree, and probably many others also; and we find the following passage in 'Turner's Chemistry,' under the head of "Tribasic Phosphate of Oxide of Silver:"—"This compound subsides of a characteristic yellow colour, when the rhombic phosphate of soda is mixed in solution with nitrate of oxide of silver..... It is apt to retain some of the nitrate in combination." This doubtless arises from a similar reaction to the one I have described above.

F. Maxwell Lyte.

* It is also curious to observe the change of colour which takes place when iodide of silver which has been precipitated in presence of an excess of iodide of potassium, is added, after being well washed, to a solution of silver nitrate, when its colour will be seen to change at once from pale primrose to a deeper and more brilliant yellow.

† It was the knowledge of the fact of the existence of this iodo-nitrate of silver—which is decomposable by water, but not so by washing with a weaker nitrate bath—which induced me, when I first published my 'Honey Process,' to recommend the addition of nitrate of silver to the syrup. This addition has since been proved by Mr. Shadbolt to be, with certain precautions, unnecessary, as the glutinous nature of the honey itself, coupled with the porosity of the collodion film in which the iodo-nitrate is formed, suffices to protect that compound from decomposition.

On the Causes of the Fading of Proofs.

To the Editor of the Photographic Journal.

Bagnères de Bigorre,
February 9, 1859.

Sir,—All writers on the chemistry of the positive photographic image seem to have left unnoticed two causes of the fading of proofs, which are at the same time among the most liable to occur, and, one of them at least, the most difficult to avoid. The two causes of which I speak are: first, the presence of a slight trace of a salt of copper left in the nitrate of silver of which the bath is composed; and

secondly, common salt, or any soluble chloride left in the finished proof by the washing water. Now, I believe that the existence of these two causes of fading are in themselves sufficient to account for many, if not all, of the anomalies which constantly arise, and drive some photographers to desperation, and others to seek for the much-desired stability in more clumsy and tedious processes. A proof printed on paper which has been sensitized in a bath containing a salt of copper combined with that of silver, will be found to behave as follows:—First, it will print slower, and on leaving the printing-frame it will look duller, and more dead in its tone than a proof printed with pure nitrate; next, when kept some time, and particularly in a moist situation, it will visibly decrease in intensity, and will fade in its half-tones; and lastly, when placed in the hypo-bath, it will entirely fade out and disappear, if the copper is in sufficient quantity in the proof,—and not only so, but it communicates a destructive property to the hypo-bath, which causes other pictures to fade, even if they have not been sensitized in a cuprous nitrate bath. The next class of substances which we have to consider—the soluble chlorides—are still more to be dreaded, on account of their occurring as frequently as they do, and being at the same time more insidious in their nature, and even more difficult to get rid of, from their almost universal presence; and I believe that operators have often attributed the fading of their positives to the use of hypo, when the true cause was to be found in the very water with which they washed that hypo out. I myself never dreamt of the existence of this cause of fading till I began to use my phosphate-of-soda printing process. On a certain occasion I had printed a quantity of proofs, and had fixed them in phosphoric acid, as described in the published process; but as the water in which I afterwards washed them was hard spring-water, I feared that some of the silver salts had been precipitated in the paper, and so I passed all the proofs through a bath of weak ammonia, and put them by, to colour them with gold at my leisure. One day I took one of these proofs and held it near the fire, when I observed it to pass from its red tone to a fine sepia. I did not remark this alteration of tone as unusual, but only as peculiarly great; I therefore warmed all the other proofs in like manner and with a similar result, and then congratulated myself on having got a process which, while it did away with the use of hypo, rendered that of gold unnecessary. But I was doomed to be disappointed: some of the pictures were pasted that night; but what was my dismay on the following morning to find they had all faded! I at first attributed this to something in the mounting-board, and determined to try a board of another kind, of known and proved good quality; but it was equally unsuccessful, for in a few hours after mounting all the half-tones had disappeared. I then thought the paste must be in fault, as I had used some made with flour; but on taking a proof, and wetting one half of it with the same paste as before, and the other with a freshly-mixed solution of dextrine (which I always employ, as it has no tendency to become sour), I found the proof, when laid simply on a clean sheet of glass, to fade as quickly as before. Part of one of these proofs was now taken, and well washed in rain-water, and another part of the same proof was washed in the spring-water above mentioned; while a third was placed in an atmosphere of steam, so as to become moist without washing. Of these three, the first two remained unfaded on drying, while the third faded as before, and the fourth piece was found to fade simply from lying in a damp place. It now became evident that the fault was subsequent to the washing with the spring-water, and must therefore lie in the bath of ammonia; but then I had frequently used ammonia, and never produced a similar effect! The solution of ammonia was now examined, and, as a preliminary step, a drop of it was evaporated on platinum foil; a residue was left, which on further application of heat disappeared: this, on subsequent examination, proved to be the chloride of ammonia. A proof was now prepared and cut in two; one half was washed well in distilled water, and the other in distilled water to which had been added a few grains of chloride of ammonium. Of these, both having been dried, the first remained permanent in a damp atmosphere, while the latter rapidly faded on drying. On trying similar experiments with the chlorides of sodium, potassium, and of calcium, the same results followed; only, perhaps, the chloride of ammonium is the most powerful of all in its action. Now, if the presence of chlorides is so dangerous to the stability of a photographic proof, is not this a clue to many cases of fading hitherto deemed so unaccountable by photographers?—and should this not teach us to wash all our pictures with distilled water, where it can be obtained, or at least with good rain-water for the last washing? Proofs toned with gold are, however, found to resist the fading action of chlorides more perfectly than others, and do not lose in vigour under their influence, at least for a long time, or unless the chlorides be in great excess.

In forming any theory on this interesting subject, we must consider the following facts:—

In order to produce the most rapid fading of such a proof, it must be first dried, or even warmed at the fire, and then placed in a damp atmosphere. Acids or acid vapours seem to specially assist the fading, and a large quantity of water, particularly if at all alkaline, retards it; above all, constant alternations of dryness and moisture seem to have the most destructive effect.

The theory which I have formed on the subject, but which is open to objections, is, that the saline body attaches itself, on drying, to the silver composing the picture, and converts part or all of it, especially if heat be used, into a subchloride of silver, with liberation of a small portion of alkali. This will account for the change of colour on drying at the fire. The picture being exposed in a moist atmosphere, the free alkali which is now in the proof, together with the remaining saline matter, deliquesce. The liquid thus formed absorbs carbonic acid from the atmosphere, which in its turn reacts on the remaining alkaline chloride. Then come into play two affinities, that of the subchloride of silver, tending to take up its full dose of chlorine and become white chloride of silver, and that of the carbonic acid for the alkali of the alkaline chloride, and these, acting together, determine the decomposition. A further drying and exposure to moisture repeats the destructive process, and so on, till either the proof disappears or the soluble chloride is used up.

This theory likewise explains why the chloride of ammonium should act more strongly than other chlorides in producing this toning and subsequent fading, inasmuch as the ammonia which is set at liberty in the proof by the formation of the subchloride of silver passes off in gas, and does not remain in the proof to retard the subsequent reaction.

With respect to the cuprous salt in the nitrate bath, I believe it to cause fading by a very similar means, viz. by the formation of a subsalt of silver, which is subsequently washed out by the hypo, and that when this reaction takes place in the hypo itself, it is more marked because it is continuous.

I may add, that some other metallic nitrates produce as disastrous effects as that of copper in the positive nitrate bath, and among them may be cited those of iron, of cobalt, of nickel, and of mercury (the bichloride of which last-named metal has long been known as a means of whitening negatives); but I believe there is no doubt that all the salts of the baser metals will, sooner or later, destroy the photographic image by a process of substitution, as above described, and a large number of experiments which I have made in this direction tend to confirm that opinion. I have profited by the property which chloride of copper and perchloride of iron possess of rapidly bleaching the photographic image, to produce a very pretty bistre tone in stereoscopic transparencies.

Take a transparency which has been printed and developed in the usual way, and, if dry, let it be placed under the tap for a moment, so as to wet the surface uniformly all over, and then pour over it a little of a solution of common salt, to which have been added a few drops of a saturated solution of the nitrate of copper (the strength of these solutions, and the proportions of the mixture, are of no considerable moment), the surface of the proof almost immediately becomes pearly white; and if the application of the mixture be frequently repeated, the whole image becomes completely decomposed, and looks white, or at most only a very pale straw-colour, by transmitted light. It is now to be washed in a stream of clean water till all traces of the salt of copper be removed.

F. Maxwell Lyte.

Taupenot's Process.

To the Editor of the Photographic Journal.

Sir,—Notwithstanding all that has been written and said on the process of Dr. Taupenot, the reasons hitherto assigned for the increased sensibility assumed by the albumen, when combined and in contact with the collodion, as compared with a simple albumen film prepared in the old-fashioned way, appear, to say the least, far from satisfactory, and to have been only tolerated for want of better.

It seems, indeed, very difficult to believe that a mere change in the molecular distribution of the albumen, or an increase of electrical action, is sufficient to account for such a marked and striking increase of rapidity.

I shall feel very happy if you, and the readers of the Journal, can find, in the experiments I am about, with your permission, to detail, an indication of a reason more approaching probability, and can agree with me in my conclusions, though I write with great diffidence, being often careless in manipulating and, to say the most, a very poor chemist.

In preparing a batch of stereoscopic (Taupenot) plates, my collodion bottle, which had been lately giving (from repeated use) a very thick film, became exhausted, and a bottle of other collodion, prepared from the same materials but giving a much thinner film, was taken into use. All the plates were coated with the same albumen and sensitized in the same bath. In the beginning of November

last, these plates were exposed promiscuously, thin and thick films as they came, and under similar conditions as to the weather, light, and time of exposure—on monuments at Ypres and Amiens—and all developed, about a week after exposure, with the same liquid. During the process of development, I was surprised to find that those plates prepared with thin collodion were not only slower in developing than the others, but that they are also wanting in half-tones, and exhibited the usual symptoms of under-exposure. Being much puzzled to account for this, a cause at last suggested itself, which I tested as follows:—

1st. Three plates prepared with iodized albumen only were sensitized and placed all together in the dark frame, one behind the other and in contact, and then exposed for half an hour, and afterwards developed in the ordinary way. The following results were obtained:—The first plate, or that nearest the lens, gave a vigorous negative; the second, or that immediately behind it, gave an image out of focus, but distinctly impressed as regards the lights, no detail in the shadows; the third and posterior plate gave misty indications of a picture, but as regards the lights only.

2nd. Two Taupenot plates prepared with thin collodion were similarly exposed for six minutes; the first gave a satisfactory negative, the second was visibly impressed.

3rd. Two Taupenot plates prepared with a thick collodion, were exposed in the same manner for four minutes; the first developed well, the second plate was free from all traces of an image.

4th. A plate was prepared with iodized albumen only, but by coating and sensitizing four times successively till a film was obtained as thick as that of the Taupenot plate prepared with thick collodion, and exposed for four minutes. On developing, a vigorous impression was the result.

These experiments were made with a pair of Ross's stereoscopic lenses; and the glasses used were of a thin species of plate glass, made in Germany for mirrors, and which has a decided blue tint, and is very thin—about twenty to the inch.

From the foregoing results I deduce the following conclusions, viz., that the Taupenot film owes its rapidity to its greater thickness and opacity to chemical rays, which latter are stopped in and absorbed by the film itself without being permitted to pass through and beyond it; and secondly, and for the same reason, the ordinary albumen film owes its (comparative) want of sensibility to its extreme tenuity, and to its consequent transmission of the actinic rays.

We are told that the luminous, calorific, and actinic rays are subject to the same general laws: they may be reflected, refracted, concentrated, or absorbed. It is the absorption (perhaps decomposition) of the actinic ray which constitutes the basis of all photography; and whatever may be the matter which possesses the property of absorbing the actinic rays, it would appear certain that *quantity* very much influences the result. A sheet of pale yellow glass in one's laboratory window will not allow the development of a positive picture without fogging; double the thickness, by putting in another pane of the same, and we may safely operate.

A great many facts occur to me which seem to confirm the views I have given above, but to mention them here would be to encroach too much on your valuable space.

I wish to add a few words on the means of readily obtaining a powdery collodion which is otherwise a matter of some difficulty. M. Duchochois has pointed out a means which he recommends for positives by the moist process, but how he can keep his bath long in order is a mystery. He directs the addition of liquid ammonia, a few drops to each ounce of collodion—a precipitate of pyroxyline immediately ensues, which subsides after a time; the clear collodion will give a powdery film.

I find by experiment that when the collodion has been iodized with cadmium, potassium, or zinc, such is really the case; but if iodide of ammonium has been used, no precipitate is formed by the addition of ammonia, but a very porous film is equally the result, and the collodion is not thinned by the loss of pyroxyline: the quantity of ammonia requisite varies from four to ten drops per ounce, according as the collodion has been prepared from a pyroxyline giving a short or a glutinous film. It is evident that such a preparation cannot safely be used in the Taupenot process, when only one sensitizing bath is employed.

In conclusion, I would strongly enjoin photographers who practise this process, and who may experience any difficulty in getting a suitable collodion, to adopt the foregoing method, and to keep a separate bath for the collodion always in use,—to add no acetic acid to this bath, but to keep it neutral as far as possible by adding very minute quantities of nitric acid if it shows any alkaline reaction, examining it frequently for this purpose. The former portion of my communication is sufficient, I hope, to induce the use of a moderately thick collodion in all cases.

Edward Mosman.

Mr. Raven's Waxed Paper Process.

6, Forres Street, Edinburgh.

For iodizing the paper, see 'Photographic Journal' for Dec. 21, 1858.

I leave my paper in the iodizing solution 24 hours, turning the papers over three or four times, and dividing them occasionally, so that they are all thoroughly and effectually saturated. The bath in which the paper is iodized should be a glass one, as also those in which you sensitize and develope.

To sensitize—

Nitr. of silver, fused .	30 grs.
Glacial acetic acid . .	35 minims.
Distilled water . . .	1 oz.

Do not be sparing of this solution, but have quite sufficient to cover the whole of the dish in which you sensitize. First float the paper; and when you see all the colour (*i. e. the free iodine*) leave it, then immerse the paper. Turn it over several times, taking care to leave no dry spots on it. The paper should not be removed from the silver under 8 or 10 minutes, nor should it be left in the sensitizing bath beyond that time. Have by your side two gutta-percha trays (*lined with glass* at the bottom) filled with rain-water; and when the first sheet of paper is sensitized, remove it to the first tray of water; then sensitize another sheet; and when the second piece is ready to be removed from the silver, take that sheet which you first sensitised from the water, and put it into the second tray; then put the second piece into the first water, and so on till you have prepared all you require. Before putting the second piece of paper into the second bath of water, take out the first piece and put it into blotting-paper, with a pad of old blotting-paper under it, on which you must put 2 sheets of *clean* paper between each piece of sensitive paper. When the paper is finished, it must be put into a fresh lot of blotting-paper, which for this last purpose may be used over and over again. Do not use the first lot of blotting-paper again, except for pads.

This paper will keep good, even in hot weather, for 10 or 12 days.

I always keep several bottles of gallic acid in rain- or distilled water; if rain-water, filter it before putting the acid into it. So long as there is a deposit of gallic acid at the bottom of the bottle, you know that it is saturated (*i.e.* after it has been mixed a few hours). As you use the water from these bottles, fill again up to the cork, and leave no air between the solution and the cork, always taking care to see that the solution is saturated.

Into a glass dish pour sufficient of the solution to cover all the picture you wish to develope (take care of air-bubbles), and immerse your pictures one by one carefully in the solution. In about 10 or 20 minutes add a little of your silver bath, in the proportion of 4 drachms to the pint of gallic-acid solution in the bath. The picture will now soon appear, even if there was not a trace of it before, which there seldom is. When the negative is fully developed, wash it well in several changes of water; and when *all* are finished, then fix all together in the same bath of hypo, of the strength of 3 oz. to half a pint of water. Watch them carefully, and remove them the moment you see no yellow (iodide) in them. Then wash the negative in 20 changes of water for a day or two, or, at any rate, for 24 hours; blot them between clean towels, and dry before a *hot* fire, so as to melt all the wax.

To ensure success in the waxed-paper process, the most scrupulous cleanliness is necessary. I attribute most of my success to glass dishes, or to gutta-percha ones lined with glass at the bottom.

Any further questions that A. B. may wish to ask, Mr. Raven will answer with much pleasure.

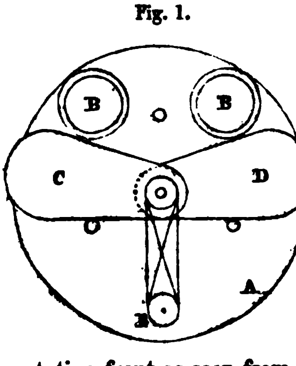
Simple Contrivance for covering and uncovering the Lenses of the Stereoscopic Camera.

To the Editor of the Photographic Journal.

Sir,—I enclose a sketch of a simple contrivance I have lately added to my stereoscopic camera for covering and uncovering the lenses simultaneously and quickly, and which I find answers the purpose so well that I think it may interest your readers

Figure 1 shows the lenses open, figure 2 closed.

Fig. 1.

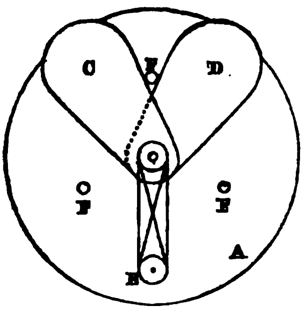


A is the rotating front as seen from the inside of the camera; B B, the lenses; C and D, flaps of blackened card sufficiently wide to cover the lenses well.

A pin turned out of box-wood, about ⅜ths of an inch in diameter, with a large flat head, passes through the centre of the camera front, working easily, but not too loosely—the flat head

being outside, and serving to turn it by. On to this pin, C is firmly fixed with glue or shellac. D has fastened to it a small grooved box-wood pulley, and works freely on the pin. Over all, another pulley of the same size is cemented to the pin, so as to turn with it. E is a third pulley fastened with a screw. F F are stops.

Fig. 2.



To bring it into working order, a thread is passed round the pulley fixed on D, then round E, and then crossed and led to the centre part pulley. When adjusted, the edges of the two centre pulleys should be touched at the point furthest from E with a little glue or dissolved shellac, to prevent the thread slipping. This movement, with little variation, may be adapted to nearly all cameras, whether with single lenses or pairs.

I believe it to be quite new; but in these days of *re-invention*, it is almost impossible to be certain. MONTAGUE MARRIOTT.

Photo-lithography.

To the Editor of the Photographic Journal.

SIR,—Out of the carbon process of Mr. Pouncy seems naturally to arise another, not less important, in the direction of photo-lithography. Is not the following sufficiently plausible?

If for the carbon I substitute finely-divided asphaltum or resin, and give to a lithographic stone an even coating of the mixture, the light, rendering the gum insoluble, will cause the resinous matter to adhere to the stone, and the rest of the coating being washed away, an image will remain, the lines constituting which are capable of receiving the greasy ink and of furnishing an impression in the ordinary manner.

Want of time prevents me from working out the idea; but in the hands of some of your readers—perhaps in those of Mr. Pouncy himself, who evidently knows more about photo-lithography than most of us—it may be turned to some advantage. HARRY DRAPER.

Mr. Fothergill's Process.

To the Editor of the Photographic Journal.

Bedford Street, Plymouth,
Jan. 12, 1859.

SIR,—Allow me to say a few words on the most excellent process of Mr. Fothergill. I have obtained some views with it in eight seconds, but now I require forty seconds. Careful experiments have demonstrated to me, that, following the simple variations I propose, the plate becomes *three times* more sensitive than by any of the processes hitherto described.

I performed carefully the following experiment:—

A plate (4¼ by 3¼) was coated and sensitized, then washed in a dish containing 3 ounces of water for 1 minute, drained, and covered with albumen for about 2 minutes, then washed in the *same* 3 ounces that was used to wash the nitrate off, and for the same time.

A second plate was treated in precisely the same way, except that it was finally washed in 2 quarts of water instead of the 3 ounces of nitrate water.

A few days after they were prepared, they were exposed in two cameras side by side (which worked in exactly the same time), for 40 seconds, in a glass house; the former plate (that washed in the nitrate water) was fully done and densely developed in 10 minutes, while the one washed in two quarts of clean water scarcely showed itself at all after the 10 minutes' developing, temp. 54°. I never can succeed with new collodion; mine has been mixed six months; when new, it was of no use for this process, although with gum, worked in the same way, it gave excellent results. Any good collodion works with gum; but I prefer albumen when the proper collodion is obtainable.

T. S. REEVES.

Archer's Fluid Lenses.

Smith Street, Warwick, Jan. 3, 1859.

SIR,—On looking over the correspondence for Sept. 21st, I find it stated, in answer to "Inquirer," that the ingredients contained in Archer's Fluid Lenses were a secret known only to himself; and from a conversation you had with him, you were led to believe that they contained a salt of antimony. Having had one of Archer's large Fluid Lenses entrusted to me for cleaning the lens (belonging to a gentleman of this borough), and being in a most filthy state, also having lost nearly half the liquid from leakage, I was obliged to replenish it. The manner in which I accomplished this I will give you as explicitly as

possible for the information of "Inquirer" and others, should you deem it worthy of a place in your valuable Journal. It is said that "necessity is the mother of invention;" and as I knew full well it would be a difficult matter to find a fluid or fluids of the same refracting power as the liquid (which, as I before stated, was partly lost, and the other portion in so filthy a state as to make it nearly useless), I adopted the following simple means:—Having provided a flat strip of deal, I placed one end against the wall, and got a person to hold it in that position; I then took the lens and a candle, anterior side facing the candle, moving the lens up and down the side of the deal strip until I procured the best possible focus. I then marked the position of the lens and candle upon the strip, securing thereby the best possible and original focus of the lens, which, I must add, was not a very brilliant one; I now dismounted the lens (it consisted of a glass rim countersunk to receive the front and back glasses,—the interior being filled with the fluid through a hole drilled in the rim, into which a stopper fits, and so contrived that the head of the stopper is flush with the rim). I proceeded to remove the stopper, which was covered with a cement; having done so, I poured the liquid into a cup. A more difficult task now presented itself: that was, to remove the glasses; this must be done very cautiously, as the edges of one of the lenses are very thin; having removed them, I polished them with putty-powder, and replaced them as before. Now came the most difficult part of the business—to fill the lens and gain the original focus. I found the old fluid a combination of acids, namely, nitric, sulphuric, and hydrochloric, and obtaining these acids in as pure a state as I could get them, I varied the proportions of each, making a trial each time I did so with the candle and lens, altering the quantities each time until the desired end was gained. I have seen negatives that have been taken by the lens, it having been done more than *two years*. I have furnished you with the name of the gentleman for whom the lens was done, for your private use, should you wish to refer to him about the matter; but I do not choose to make mention of his name publicly, not knowing whether he might approve of it or not. I trust I have not too far trespassed upon your valuable time and patience. ISAAC YEOMAN.

To the Editor of the Photographic Journal.

Cliffe Cottage, Jan. 15, 1859.

SIR,—I was painfully surprised on my return from a short absence from home to find, on looking through the last Number of what I have always considered your most valuable publication, that you have now inserted my communication to you of July last, wherein I described what I then believed to be a novel mode of applying diaphragms between the lenses of a portrait combination; and still more surprised was I to find that you had not given any date to my letter. Now, in common fairness, I claim to have the date of that letter published, inasmuch as, if that be done, your readers will believe me when I say that my arrangement was in use long before Mr. Waterhouse published his description; and had my letter been fairly dealt with, it would have appeared in the same Number of the Journal as that which contains his communication: and though I by no means wish to impute to Mr. Waterhouse that his description was the result of information from others who had previously seen my apparatus (for it was never made a secret, and was openly shown to many photographers in the West Riding long before I wrote to you), yet coming, as my letter appears to come so long after that of Mr. Waterhouse, I wish to clear myself from the impression that must inevitably ensue on reading your Number, that I had claimed a discovery which fairly belonged to a brother photographer.

Believing that there may have been some mistake which will account for what I complain of, I trust to the known fairness of your Journal for the early insertion of this letter.

H. R. SMYTH.

Copying Paintings.

To the Editor of the Photographic Journal.

SIR,—The copying of paintings by photography is a subject which, I think, demands increasing attention on the part of those who desire to *elevate* the art. The prospect of obtaining a process of printing in carbon, and the hoped-for success of photography, add increasing interest to this question, which even in the existing state of photography is one of much importance, especially in relation to the popularization of the *best* works of art.

As an amateur myself, and hoping some time hence to have opportunities of copying valuable paintings on the Continent, I feel a great interest in this branch of the art, which is becoming one of much *general* interest. It has therefore occurred to me, that you might consider it worth your while to procure a communication on this subject, to be *read and discussed* before your Society, and then *published* in your Journal. Mr. Thurston Thompson I see has been engaged in taking copies of the Hampton Court Cartoons, and he or some other gentleman of *special* experience in this branch might be induced to favour the public with a

short essay or treatise on copying paintings. The two points which strike me as being of special importance are these:—

1. The best mode of overcoming the difficulties connected with the colours and actinic action, and how far these can be overcome by chemicals, adjustments of lenses, and other procedures or adjustments.

2. The practical management of the apparatus, having regard to the circumstance that in galleries the use of *water* has peculiar disadvantages.

I set aside the *dry* processes, as too slow and otherwise objectionable for such a purpose; and I am disposed to think that wet collodion is the best of all. It is that which I believe artists so employed always prefer.

Practical suggestions as to the use and economy of water, the form of camera, and dark room would therefore be very valuable. It is well known that a large proportion of the best stereoscopic slides are produced by *amateurs*; and these too would, I believe, gladly devote time to *copying works of art* if they had the *practical* knowledge requisite for doing so.

H.

Photography in Japan.

To the Editor of the Photographic Journal.

SIR—In a series of articles published in Blackwood's Magazine, entitled "A Cruise in Japanese Waters," occurs an interesting anecdote, illustrating, in a remarkable manner, the demand for the uses of Photography even in that remote quarter of the globe. The passage will be found in the Number for January 1859, and we give it without further comment:—

"On all the thousand and one difficulties that occurred to the Japanese in carrying out their system of imitating in Japan all we could produce in Europe, the Dutch instructors were expected to throw a light. They were never daunted by the difficulties they had to surmount, and strove hard to impart all the knowledge that was sought. As an instance of the abrupt and unexpected queries put to them, one of these persons told me that a Japanese came all the way from the capital (an overland journey of forty odd days' duration) to inquire about one particular subject. What was it? 'Explain the means by which the hourly variations of the barometer may be registered by means of a photographic apparatus!' My informant was for a time fairly puzzled; but at last, in some recent work on photography, he found what had been done, and told the messenger how it was possible to do so. 'But surely you want some other information?' he asked. 'No; that was what he was sent to know; and he had no other business!'"

The people inhabiting Japan are evidently a remarkable race, and destined, by God's help, to play an important part in the future history of that quarter of the world. Yet we cannot help feeling surprised at so advanced a state of mental cultivation, and scarcely expected that our art had become already to them a necessary of life. Such demands would surprise us less in Europe.

F. B.

ANSWERS TO CORRESPONDENTS.

S. D. G. (*New Ross*).—Bottles made of yellow glass can be procured from the dealers in photographic chemicals. They are about double the price of the ordinary bottles in use.

Pharmaceuticus.—Your letter has been forwarded to the Secretary of the Photographic Society of Scotland.

Photophilus (*Dublin*).—You must consult our advertising columns. There are so many dark tents constructed, that we cannot undertake to recommend you any particular maker. Security, if the day proves a little windy, is a qualification which few possess; and it should especially guide you in your selection. 2. Common water may be used.

Mr. Beatty, of College Green, Dublin, has published on a sheet for suspension his 'National Photographic Almanac' for the year 1859. As a curiosity connected with our art, it should be preserved in the Photographer's Library.

Calotype.—In making your iodized paper use Turner's paper, and let it be tolerably thick; by this paper you will get good half-tones. Whatman's paper will produce a more intense negative, and which seldom prints well, although it looks pretty to the eye. The violet colour you notice depends upon the starch coming in contact with the iodine. Starch occurs in nearly all French papers.

Ground Focusing-glass.—Mr. Keith, in answer to Mr. B. Jones, says, "I think I can give a good answer to the query, 'Why is the ground side of the focusing-glass almost invariably placed inwards?' In all cameras I have seen, the focusing-glass is put in from the back of the frame; consequently the thickness of the glass is of no importance. If the ground side were placed outside it would be much more difficult to adjust it to the focus, as the pane would have to be rebated out to the thickness of the glass, and, in event of its getting broken, another piece of the same thickness would be indispensable. 2. Thanks for your suggestion.

J. L. S.—1. Use the yellow woollen material mentioned in our last Number in reply to Photophilus. 2. A portrait lens is much quicker in its action than a landscape; if a very small diaphragm is used, you will much increase the depth of focus. 3. A lens of a shorter focal length will enable you to accomplish your object.

A. W. Wills.—A reply in our next.

Communications received.—Sir J. J. Coghill; Mr. Langton; C. Thurston Thompson.

At the period of our going to press we have received a communication from Mr. J. Traill Taylor, of Edinburgh, on the Alabastrine Process, and which shall appear in our Number of the 21st inst.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 81. MARCH 21, 1859.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

ORDINARY MEETING.

March 8, 1859.

HORATIO ROSS, Esq. V.P., in the Chair.

The minutes of the preceding Meeting were read and approved.

The following lady and gentlemen were balloted for and elected ordinary Members:—Miss TAYLOR; Mr. JOSEPH LOCKETT, Junior; Mr. JAMES STEWART; Mr. WILLIAM CUTHBERTSON; Mr. WILLIAM ANDERSON, Junior.

THE CHAIRMAN then said—It is now my pleasing duty to hand the medals to the successful candidates in this our first competition. When we determined to strike a die and have a medal, I hoped it would be a means of inducing photographers from all parts of the world to send their productions to our Exhibition; and the result has justified this expectation; for the Exhibition which has just closed was undoubtedly the best we have yet had. To Mr. Lyndon Smith and Mr. Raven I now tender their medals, and hope that the fact of their being the successful competitors this time will not hinder them from doing all they can to be also successful at our subsequent Exhibitions; and those of us who have been unsuccessful on this occasion, must do our best next year, when I hope there will be a third medal for the best portrait group, which will give our professional brethren a better chance than they now have, when, as shown by the voting for the medals, the competition is practically confined to landscapes.

Mr. Raven and Mr. Smith having returned thanks for the honour conferred on them by the Society, Mr. Smith proceeded to make the following observations on Photography, more particularly on the Wet Collodion Process and on Printing:—

Notes on the Collodion Process, and on toning by the Alkaline Bath of Chloride of Gold.

BEFORE proceeding to detail my practice of the collodion and positive printing processes, allow me to make some remarks on the various negative processes in common use among photographers. I believe I have tried nearly every one of the numerous plans which have been brought out in the different journals,—at least every one having any claim to consideration by any but the tyros in our art; for many of them are sufficiently absurd in the reading merely. I believe most of the members of your Society are followers of the wax-paper process; and next to the *wet* collodion I should be inclined to rank this most excellent and useful method of obtaining negatives—one which I have worked myself with considerable success. But I have been led to adopt the wet collodion for many reasons. That the finest negatives are obtained by its means, no one will, I imagine, be inclined to question; and that it can render with delightful accuracy many of those more subtile transitions and effects of nature in her capricious moods, which are to the thoughtful artist her greatest charm, the works of our first men sufficiently prove. If this be the case, it is impossible for any one, anxious to stand amongst the foremost in the ranks, to adopt any other than the best and perhaps only means of catching these transient effects. Then, though the weight of apparatus is a great drawback, there is great satisfaction in securing *undoubtedly* and on the spot the desired view; and one is often sufficiently exhausted with a long day's wanderings in search of the beautiful, without the additional burden of waiting for the tardy development of the

latent impressions in the evening, when rest and quiet are generally more desirable.

I am sure there is no part of the photographer's apparatus so much needed as a really good and *cheap* camera. To *see* many of the cumbrous and needlessly expensive instruments which are provided for the enthusiastic disciple of the art, is enough to deter him from entering into so tremendous an undertaking as procuring all his necessaries on the same scale. £16 to £20 is the price asked and obtained for some of these highly-finished specimens of the upholsterer's workmanship. I am sure it is unnecessary for any one to spend a fourth of that amount to obtain a capital and perfectly efficient camera. This one, which I have the pleasure of showing you, is, I think, a thoroughly good working camera; and the price, with two slides and exclusive of brasswork (of which there is not much), was about twenty-three shillings. You will observe that the slide is opened by a key from the outside, a door being made to fall down inside,—which principle I recommend in preference to the usual shutter made to pull up, and which is so liable to stick at the critical moment, or to splash the collected silver when shut down. The small lens I show you (1½-inch diameter) was made by Goddard; the price is 15*s*. I will pit it against any lens of its focus for pictures 10 × 8 (excepting the orthoscopic), for *depth of field* and equal illumination. The collection of views which is on the table for your inspection was taken by it, and will speak for its merits.

I must recommend every collodionist to make his own collodion. The quality of this material is of the utmost importance; so much so, that, though it may seem strange to say it, I think the man who buys his collodion might almost as soon buy his picture ready made and lay claim to the *exclusive* production of it.

All competent authorities on the subject (and I may point to Mr. T. Hardwich as the greatest) are agreed as to the difficulties of making a uniformly good and reliable collodion. The formula I have always used for making pyroxyline is one, I believe, first given by Mr. Hadow, and one which is generally satisfactory in my hands. It is as follows:—Take dry nitrate potash 1 lb., water 4 drachms, mix in a warm dry basin, and add 2 lbs., by weight, of the very strongest sulphuric acid (I get mine from the cloth dyers of our town who are obliged to keep the strongest samples); and mix thoroughly, crushing the lumps of the salt with two pieces of strong plate glass, say 3 inches wide, and of convenient length; and when the effervescence has ceased, put in cotton-wool, adding small quantities at a time, till all the fluid is absorbed, and keeping up the temperature to about 120° or 130°; then leave the whole for 10 minutes, and finally wash in the usual manner, and towards the end use two or three changes of warm water. There is no occasion to use any alkali to neutralize the acids; these will be removed by proper washing. I find equal parts of ether and strong spirit of wine (both methylated) give a very good proportion for a negative collodion not intended for very large plates, say up to 13 × 10. The iodizer is iodide and bromide potassium: 4 grains of the first, and 1 grain of the latter to the ounce. The collodion must be of a good consistency, and give a rich creamy film, not due to excess of iodides and bromides *but of the pyroxyline*: this, I am certain, is a most essential element to success; and it is most instructive to compare the results of a thin and thick coating as to density and gradation of shade.

As regards the nitrate bath, about which so much has been written, I believe it is a great mistake to add "intensifiers," or "accelerators," or any extraneous materials whatever; and I am sorry to find a great authority recommending the use of some organic substances for these purposes. A simple solution of PURE nitrate of silver, of 30 grains to the ounce, is all that is required, and when become alkaline should be corrected by *acetic* acid: by all means avoid nitric acid either for *positives* or negatives; it is the source of all manner of evils. Excuse my speaking thus dogmatically, I feel sure, from considerable experience, my opinions on this point are correct. I have almost entirely discarded pyrogallic acid now for developing, in favour of sulphate of iron; I find an immense advantage in its use as regards the power of bringing out a feeble impression of the camera image, and the greater cleanliness caused by the larger quantity which may be used without economical considerations obtruding themselves, and its power of dismissing cometary and stellar appearances which used to show themselves so provokingly under the pyro-developer. It is rather unaccountable why the iron developer should produce so much cleaner a negative than the pyro, even when the exposure has been the same; but I have often noticed that it is so. The formula for the iron solution, is

Sulphate of iron . . .	1 ounce.
Water	1 quart.
Acetic acid	1 fluid ounce.
Spirit of wine	1 ,, ,,

After the details are well brought out with the above, wash well, and intensify with

Pyrogallic acid	3 grains.
Water	1 ounce.
Acetic acid	$\frac{1}{2}$ drachm.
Spirit of wine	$\frac{1}{2}$,,

adding nitrate of silver solution just before using, proportions *varying with circumstances.* Sometimes (when there is any difficulty in strengthening, through deficiency of light or a low temperature) it is advisable to add a few drops of citric acid to the latter solution, to prevent the decomposition of the mixture. The citric acid, however, sometimes gives a disagreeable tint to the negative, approaching the bad-printing colour of a collodio-albumen negative. The intensifying may be carried to almost any extent; and this method of developing is most useful in copying engravings: the image is often so faint after treatment with the iron solution, as to be almost imperceptible, but comes up under the prolonged action of the pyro-intensifier into a sufficiently dense negative: I have copied engravings very successfully with a newly-iodized collodion by operating in this manner. I usually fix with a very weak solution of cyanide of potassium, and varnish with a solution of white shellac in spirit of wine.

I am glad to be able to detail to you a method of toning positive prints which will be, I am sure, found as correct in theory and reliable in practice as the usual methods are false in the first and detestable in the latter. I refer to the use of the alkaline chloride of gold bath. I have now had eighteen months' practice in this method, and have seen many hundreds of prints produced by it; and in *no one instance* have I ever known a print to fade. On the other hand, I have a portfolio of proofs toned by the bath of hypo and gold mixed; and they, without exception, and though every precaution as to washing thoroughly in hot water, &c., was taken, have every one faded. I may claim the independent discovery of this most valuable way of colouring proofs, as I had toned by an alkaline chloride of gold before the process was either published in Mr. Hardwich's Manual, or in the Photographic Journal. My method of manipulation is as follows:—In the first place I always make my own chloride of gold, as I can never place confidence in that bought. Put a half sovereign in a convenient vessel (a bottle will do), and add nitric acid $\frac{1}{2}$ drachm, muriatic acid $2\frac{1}{2}$ drachms, water 3 drachms, and set to dissolve in a warm place. This quantity of acid will take up about half the gold. When the acid is saturated, make up to 2 ounces with water, and keep this solution for use. The addition of about the same quantity of fresh acids will complete the solution of the gold.

The paper I have found most suited to this toning process is Mr. Sanford's highly-albuminized *papier Saxe*, which is generally very equal in quality, and tolerably free from streaks and markings. Excite this on 80-grain nitrate solution, and wash after exposure, which must be prolonged rather beyond the time usually given for the ordinary methods, in three or four changes of water. The toning bath is made thus (I give *about* the proportions, as I always make mine by guess)—

Water	12 ounces.
Saturated solution of common washing soda	1 ounce.
The solution of chloride of gold, say	1 drachm.

This quantity of gold might tone (perhaps eight or ten prints 10×8. If the pictures do not tone rapidly add more gold. Do not be afraid of the gold; it can be all recovered, and not one grain will be used more than is necessary to produce the requisite colour. I do not find any advantage in heating the bath; it often turns the whites yellow; and I think it much preferable, if the action is sluggish, to accelerate it by adding more gold, than by heat. When the prints are toned to a fine purple blue, they may be immersed *direct* into the hyposulphite of soda, strength immaterial, say, 8 ounces of the salt to 16 ounces of water. Then wash as usual, in hot water if convenient. The gold bath must be used immediately after mixing, as it soon loses its colouring properties. It is much better to keep this bath, and use it again by adding more gold and soda (I add them by guess, according to the number of prints I want to tone), than to make a fresh bath every time. When it becomes very thick and dirty (from part of the albumen which it dissolves from the paper), all the gold will be precipitated by adding an excess of solution of sulphate and iron, and may be collected and redissolved as at first, together with the sediments from the dishes and bottles in which the various operations have been carried on.

Mr. Smith, in the course of his address, exhibited the camera with which he had taken his pictures. It was a folding, single-bodied, mahogany one, made by a country cabinet-maker, at a cost of about twenty-three shillings. The dark slide is constructed on the principle of Daguerre's camera, with a hinged folding door instead of the usual sliding one. The lens he has hitherto used has been a small achromatic meniscus by Goddard, but, in order to have the *best possible* lens, he has recently procured one of Voigtlander's orthoscopic ones; he is unable, however, as yet to discover any advantage it may possess over the other, as, in practice, the meniscus works equally well.

Mr. Tunny believed that all the members would feel, as he did, much obliged for the interesting observations which had fallen from Mr. Smith. In some running

comments on the subject, Mr. Tunny said that, in his experience in making collodion, it was of no consequence that the nitrate of potash should be absolutely dry; it was better to use it as it was, there being quite enough water of crystallization to obviate the necessity of adding water for the purpose of keeping up the heat. He invariably avoided water. While assenting to Mr. Smith's remark that all photographers should make their own collodion, Mr. Tunny thought it strange that Mr. Smith could meet with no reliable collodion in the market; he saw no reason why one should not get as good pictures as another if the collodion of both was taken out of the same bottle. Too much stress was apt to be put upon the collodion, whereas, in most cases, the difference is in the operators. By care in ascertaining the proper way of working it, he believed good results attainable by any good collodion. As to the merits of protosulphate of iron as a developer, he might say he had not used pyrogallic acid for these nine years. Every variety of depth and tint might be got by the iron salt. For toning prints, he had always used a bath rather alkaline—at any rate, never acid. His portfolio contained several prints toned with gold, which had faded; but in every case he had found it to be the result of imperfect washing. For some years back he had subjected every print that he had produced to a most thorough and complete washing in *boiling* water; and since doing so he had never had a single print which had faded. Four years ago he had sent out a number of prints to India; he had recently received nine of them which had been returned unsold; and in none of them had he detected the slightest tendency to fade. He invariably used *new* hyposulphite for fixing; and, in consequence, he is never troubled with dingy whites. He prefers a pretty strong fixing-solution, which, if new, and the print subsequently treated with boiling water, will ensure freedom from dingy, fading pictures.

The Chairman said the subject of fading of pictures was one of the most important that could be brought before the Society. He could corroborate what Mr. Tunny had said, as, for all that he (the Chairman) knew about photography, he was indebted to Mr. Tunny; and during the last five years he himself had printed some thousands of pictures, not one of which had faded.

Mr. Raven stated that he also stood in the same relation to Mr. Tunny as the Chairman did; and he would beg to add his testimony to the permanence of prints as treated by Mr. Tunny.

Mr. Cosmo Innes called attention to the rapid fading of several pictures sent over to this country by Italian photographers; and some Members gave it as their opinion that these pictures had been very imperfectly washed.

Mr. A. Bryson stated that this was scarcely to be wondered at, as, from experience, he could say that there was not a drop of water to be procured about Rome that did not contain a sulphate.

Mr. J. T. Taylor moved, and it was unanimously agreed to, "That a Committee be appointed to inquire into, and report upon, the merits of the various forms of landscape-lenses now in the market." He thought that such investigation was very much wanted by photographers generally; and by appointing an efficient Committee to test the matter carefully, good service would be rendered. In reporting on them, it would be necessary to mention every circumstance connected with each, such as diameter, stop, focus, rapidity, aberration, and sharpness.

Messrs. Raven, Tunny, J. Bryson, and J. T. Taylor were appointed a Committee; Mr. Taylor to be convener.

A communication was afterwards read—

On Varnish for Collodion Negatives.

By Mr. John Sang.

During an experience of about four years I have tried seven kinds of varnish. Of these, one only gives a really good and permanent protection to the film of collodion. Through the others, I have deteriorated, and in too many cases altogether lost, valuable negatives, some of which can never be replaced. Most of the varnishes were highly recommended, and I observe some of them still brought up from time to time in the journals. The reason of this is, that sufficient time is not taken to test the real qualities of the preparations, which do not always show themselves till after some months' use.

1. Gelatine.—This was highly recommended about four years ago. I varnished eight negatives with it. Seven were in the course of a few weeks quite destroyed by parts of the pictures and varnish together being torn off the glass in the course of printing. To one of them, which I still have, a coat of bleached lac, dissolved in spirits of wine, was added; but the protection is not effectual, the picture breaking away in small pieces.

2. A thin coat of gum-arabic, and after drying, a varnish of bleached lac in spirits of wine.—This is a shade better than the gelatine: but let no one use it; of a good many valuable negatives so treated, only a few now remain. The picture comes off in small round patches.

3. Copal dissolved in chloroform.—This makes a middling-good varnish, and what may be called an honest one, as its faults are apparent at the first. It diminishes the sharpness and clearness of the pictures. It is, however, durable, and does not colour by use, at least to the extent of taking a few hundred copies.

4. Water varnish; that is, bleached lac dissolved in a hot solution of borax.—This is a very bad varnish for collodion negatives; on the first damp weather after it is spread, the pictures become covered by a network of veins, and so are destroyed. This varnish is a valuable one for positives on paper. Contrary to what is stated in books on varnishes, I have always found that the lac is less coloured in a solution of borax than in one of ammonia.

5. Copal oil varnish; very fine white copal dissolved in linseed-oil and thinned *while hot* by turpentine.—A warning against the employment of this varnish is useful, because at first sight, that is, for a few months after it is applied, it appears to be all that can be desired for protecting the negative; it is easily spread, colourless, does not alter the tone of the picture,

and is a perfect protection against scratches, being both hard and tough; its fault is that it becomes yellow by age. I varnished many pictures with this preparation, and have them still without a scratch on their surfaces: prints can be got from them as good as at first, but then the time of exposure is very much increased. The yellow colour comes on gradually by age alone, independent of the exposure to light; and I find some duplicate pictures that have never been printed from, as yellow as their copies from which five or six hundred prints have been taken.

6. Mastic dissolved in turpentine; also, a mixture of dammar and resin dissolved in turpentine.—I varnished a few negatives with these solutions, but not having had many prints taken from them, I cannot state anything further of their qualities than that they both appear, on trial with the nail, to be brittle.

7. A preparation sold under the name of Soehnée's varnish.—I have coated some hundreds of negatives with this, many of them have been extensively printed, and from one of them a thousand copies have been taken. The pictures are still unscratched and colourless, and give prints in no respect different from the first proofs. This varnish is easily spread, dries quickly, and does not alter the tone of the negative, but it is not quite so tough as that made with copal in oil.

Of the only good one of these solutions, "Soehnée's varnish," I do not know the composition; and I have laid this paper before the Society more in the hope of learning it, or the composition of some other one similar and as good, from some of the members well informed in the matter, than in the expectation of imparting anything of much value; although what I have stated as the result of a few years' trial may perhaps be the means of saving valuable pictures to other members beginning to mount the photographic hobby. To these gentlemen I do not say, use this particular varnish, as there are doubtless others as good, or perhaps better; but I say, do not by any means use any of the other six I have mentioned. Of all the ways of losing a good picture, that by bad varnish is the most teasing. Accidents in the fixing, washing, or even a breakage now and then, may be passed; but the destruction by varnish is a serious thing, as it is not only the one in hand, but the whole series treated in the same manner which will certainly follow it. The varnish appears to consist of sandarac, benzoin, and a little elemy dissolved in spirits of wine. As a matter of economy for photographers, it would hardly be worth while to make it at home, the price not being excessive; but I wish much to know its exact composition, not from mere curiosity only, but because it is excellent for other than photographic purposes, in which its price would be worth considering. Its composition cannot be discovered by analysis, and experiments made to compose another similar and as good would not be conclusive till after a trial of a year or more.

Mr. A. Bryson remarked, that all varnishes, the refractive indices of which were higher than the collodion film, were objectionable. He had experience that a negative plate yielded a better print before it was varnished than after the operation. Having given his views of the various refractive powers of varnish, and their influence on the impression, he suggested that the protecting film spread over negative plates should be as near as possible of the same refractive index as the collodion. In answer to a remark of Mr. Lyndon Smith, he said that he was not talking in ignorance, either of photography or optics. He was the first (in Scotland at least) who produced a portrait from the living subject by the daguerreotype, in 1838, which was exhibited at the Meeting of the British Association in 1840; and he had at the same meeting exhibited an instrument for measuring the refractive powers of minerals, the principle of which bore distinctly on the subject at issue.

On the motion of Mr. J. T. Taylor, a Committee was appointed to examine and report to the Society on the various new forms of lenses recently introduced, the Committee to consist of the Rev. T. M. Raven, Mr. Tunny, Mr. James Bryson, and Mr. Taylor, with power to add to their number.

The Meeting was then resolved into a Special Meeting of the Society, to consider the following motion, of which notice had been given in the billets:—"That, in consideration of his discoveries in photography, the Society do present a gold medal to Mr. Fox Talbot." The motion having been proposed by the Rev. T. M. Raven, and seconded by Sheriff Sandford, was carried unanimously. The Society then adjourned.

On various Salting, Sensitizing, Toning, and Fixing Baths, with Specimen-formulæ. By C. J. Burnett, Esq.

To get a rapidity at all resembling that of the negative processes, it may be necessary to have recourse to development-processes; but without having recourse to the development-processes, it is perfectly possible to produce prints with much greater rapidity than the ordinary process will yield them. My experiments point out that, by using the *bromide* along with and instead of part of the chloride used in salting, in the proportion of from one-sixth to one-third, a very considerable advance in rapidity is attained *without any inferiority in the print.* The fluoride, and the iodides (but in rather smaller proportions) may also be called in. The

cadmium and other bromides and iodides have perhaps some advantage over the alkaline salts, which are apt to act on the paper-size. For papers intended for floating on plain nitrate baths, I found great advantage in adding a proportion of citrate, tartrate, or other vegetable salt to the salting solution. This counteracts any tendency to red, particularly with iodides and bromides, and gives a good purple tint. A paper salted with tartrate or citrate, chloride, and bromide answers well; we may omit the bromide when we intend fixing with ammonia. Iodides of course can be used only for papers to be hypo-fixed; benzoates and succinates, along with chlorides, give very fast and good coloured prints, fixable by ammonia; or, with a proportion of bromide, a still quicker printing process.

Next, as to the other bath, we have, besides the plain nitrate bath, for which all the salted papers we have alluded to are suited, the alkaline silver bath, including the good old ammonia-nitrate bath, the ammonia-oxide bath; and besides these, I have tried, with more or less success, pure or *mixed with the ammonia-nitrate*, the ammonia-tartrate, the ammonia-citrate, the ammonia-racemate, the ammonia-phosphate, the ammonia-fluoride, the ammonia-benzoate, and the ammonia-succinate of silver: the two latter are, however (probably owing to impurities), sometimes apt to dirty the bath.

Such solutions may be formed in various ways: *e. g.* we may dissolve the citrate, tartrate, benzoate, acetate, succinate, or other silver salt, in ammonia or in an ammoniacal salt of the same acid (forming in the latter case a double silver-ammonia salt); or we may add a little of the silver citrate or silver tartrate to an ammonia-nitrate, each with excess of alkali; or we may simply introduce the action of the vegetable or other acid by neutralizing the excess of ammonia in our ammonia-nitrate bath by the addition of citric or hydrofluoric acid, or we may add the acid first and the ammonia afterwards, or we may add the two in combination. Similar additions may also be made to an ammonia-oxide-of-silver bath. It appears to me that these additions to the ammonia-nitrate or allied bath have some advantage when we are going to use such a bath along with vegetable acid salts, over the plan of introducing them in salting the paper, which is intended for floating in such a bath. Besides the simple ammonia-citrate and ammonia-tartrate, I have also added the ammonio-ferric salts of these two acids to the ammonia-nitrate bath, getting thus a dark brown bath, giving good coloured prints with chloride, chloro-bromide, and chloro-iodide salted papers: the citric or tartaric acid prevents precipitation of iron even by the excess of alkali, and the sensibility of the iron salts apparently increases the sensibility, though I have not compared this and the similarly salted papers which had been floated on the bath with ammonia-citrate by leaving them exposed at the same time, so as to speak with confidence as to the exact action of the iron.

Where we are to fix with hyposulphite, *a printing process which I would recommend* in winter and dull weather, *and in all cases where time is an object, is paper-salting by chloride of ammonium or sodium, along with bromide of potassium, ammonium, or cadmium, and the sensitizing by the ammoniacal silver bath*—either the ammonia-oxide bath, or the ammonia-nitrate bath, as ordinarily prepared, or with the addition of some of the citric, tartaric, or other vegetable salts of ammonia. *This process gives great delicacy of detail, i. e.* an adequate representation of the negative in the prints.

Where ammonia-nitrate is not used, the bromides and iodides, also the citrates, fluorides, benzoates, &c., are of course equally applicable to, and most valuable for, albuminized paper.

By the way, the old collodion-bath, about the utilizing of which for printing a proposal has been made lately, might be easily converted into an ammonia-nitrate bath by adding ammonia to it before or after precipitation of the citrate. The re-solution of the precipitated citrate would be a gain (also that of the iodide, if redissolved?). This, however, I have not tried, and merely give as worth a trial. I may mention that I have got pretty good prints, though slower, by sensitizing unsalted paper with the ammona-nitrate bath alluded to, containing ammonia-citrate of iron, and the other baths named, particularly those containing *fluorides*, benzoates, and citrates.

A few words as to toning baths. I have long recommended an alkaline toning bath, but without the citrate now introduced by Mr. Hardwich. This may have (and, being recommended by such a sound experimentalist as Hardwich, must have) some advantages; but I find the *plain alkaline* bath give pretty good colour, and it has the one advantage of being less apt to go wrong. Reserving all detailed observation of every kind as to the employment of platinum for another paper, I briefly reiterate my old recommendations for platinum toning baths: being, 1st, a neutral bath, formed by solution of platinic nitrate, sulphate, or acetate (or salt *other than* bichloride); 2nd, an alkaline bath formed either by addition of any alkali, or its carbonate, to the first bath (or to one of bichloride?), or else by dissolv-

ing pure (precipitated and washed) hydrated platinic oxide in a solution of one of the alkalies (or its carbonate?); 3rd, last, but not least, similar baths, neutral or alkaline, to the above, but prepared with platin*ous* oxide or its salts, instead of with platin*ic* oxide. [N.B. As accelerating agents we may add to any of the above baths alcohol, sugar (of grapes or cane), tartaric or formic acid, or their salts.] Here is "*verbum sap.*," each one pleasing himself as to proportions which are neither deadly nor vital to a grain or so. Still there is a wide field for the legitimate experimenter, as well as for him who is anxious, without the labour of finding out any new principle, to earn a cheap fame as the discoverer of "a new process."

Instead of immersing the prints in solution of salt before toning, mine, and I think a better plan, was to wash out as much of the silver as we can with plain water and with *ammonia* water. This gives better colours, and prevents so much silver going into the toning bath and the hyposulphite fixing bath, *out of both of which it should be kept as much as possible.*

As to the fixing baths, where bromides and iodides are employed in printing, we must as yet be content to employ hyposulphite of soda; but in salting with chlorides or *fluorides* alone, together, or along with tartrates, citrates, acetates, benzoates, succinates or allied salts, I cannot see the smallest obstacle to fixing with ammonia on unalbuminized (or even albuminized?) paper—and that whether we use plain nitrate, ammonia-nitrate, or any of the other sensitizing baths.

The alkaline gold bath, in this case, is applied *after* a slight preliminary fixing by ammonia. The great and invaluable advantage of ammonia-fixing is, that we can at once test the security of any print so fixed, by dropping it in a solution of sulphate of iron or gallic acid, and exposing it to sunshine for a few minutes. There is no similar test for the security of a hyposulphite-fixed print.

[To be continued.]

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith. The same proviso extends to communications to the Editor.

On an Improved Method of Preparing Metagelatine Plates.

To the Editor of the Photographic Journal.

Bagnères de Bigorre,
March 5, 1859.

SIR,—I am much gratified by the general approbation which my metagelatine process seems to meet with; and one of my principal objects in writing to you to-day is to offer my thanks to Mr. Crookes for his advice as to the preparation of metagelatine, and to Messrs. Featherstone, Long, Cleaver, and Heisch for their practical details on the working out of the process. Having profited by the various hints of these gentlemen, I am now going to offer you what I consider to be an improved method of preparing metagelatine plates.

1. *To prepare Metagelatine.*—Soak 500 parts of fine gelatine in a pan of cold rain-water till it becomes thoroughly saturated and softened; then lift it out and throw it on a sieve to drain. Place it in a porcelain-lined saucepan, or if that be not at hand, one of common tinned copper, and warm it up over a slow fire till melted, and then heat it to boiling; then add 100 parts of pure oxalic acid, cover the saucepan, and let it boil again slowly for one hour. Remove the saucepan from the fire, and while the liquid is still hot pour it out into a capacious basin, and neutralize the acid it contains with chalk. The point of neutralization is known to be arrived at by a further addition of chalk ceasing to cause effervescence. Care should be taken to add the chalk gradually, so that the liquid may not run over the sides of the vessel. The liquid is now to be separated from the sediment of oxalate of lime by allowing it to subside, and drawing the clear liquid off with a siphon, or more quickly still by straining through a linen cloth. Any way the liquid is still milky from suspended oxalate of lime, and in order to render it quite clear, the whites of three eggs should be beaten up with their own bulk of water and added to it, and the whole once more brought up to boiling, when the white of egg coagulates, and catches up all the suspended oxalate of lime, and the liquid being again filtered passes quite clear. It ought to be about the colour of sherry. The filtered liquid is now to be mixed with $\frac{1}{8}$th of its bulk of alcohol, and being stored away in bottles it will keep indefinitely.

2. *Cleaning the plates.*—Soak the glass plates for an hour in a solution of carbonate of soda, prepared by adding a teacupful of common washing soda to a quart of water; lift them out and rub them with some tripoli powder, and then rinse them in a stream of running water, and wipe them dry with a clean cloth.

The cloths should be cleaned by boiling them in a solution of soda like that above described, and afterwards rinsing in pure water. No soap or grease should ever be allowed to touch them. The plates should be cleaned an hour before using, and should be kept in a very dry situation; and it is almost needless to say, that the laboratory in which dry-collodion plates are to be prepared should be free from vapours, dry, and well ventilated. And on account of the long time the plate is exposed during its preparation, more than usual care should be given to the lighting of the room, so as to secure a light of uniform yellow colour. Paper may be stained of a very suitable yellow by painting it over with the tincture of turmeric.

3. *Collodion and its application, &c.*—I cannot give a better formula than that of Mr. Hardwich, with only this exception, that I do not quite agree with him in recommending a large proportion of alcohol to be added to the collodion, as this always tends, at least in my hands, to produce blisters. Indeed, the collodion which produces the most adherent film I believe to be that which contains the least possible amount of alcohol, and it should never in any case exceed ⅓rd of its whole bulk. An old collodion, or one which contains pyroxyline made with acids at a high temperature, is to be recommended. The following will be found good working formulæ.

Winter.

Pyroxyline	8	parts.
Ether	800	parts by measure.
Absolute alcohol	200	
Iodide of cadmium	6·25	parts.
Bromide of cadmium	2·5	parts.

Summer.

Pyroxyline	8	parts.
Ether	700	parts by measure.
Absolute alcohol	300	
Iodide of cadmium	6·25	parts.
Bromide of cadmium	2·5	parts.

As this collodion contains but a small amount of alcohol and dries up very quickly, the following precautions are necessary:—The plate should not be held in the fingers, but on a plate-holder; and as soon as the collodion ceases to drip, and begins to set on the lower edge of the plate, it must be turned round, and held slantingwise, but face upwards, so that the corner at which the collodion was poured off shall be uppermost, and the opposite corner lowest. By this means the vapour of the ether flows back over the plate, and prevents the complete drying of that corner at which the collodion was poured on (and which would otherwise dry too quickly) until that at which it was poured off becomes set, and ready for immersion.

4. *Sensitizing the plate, and the application of the metagelatine.*—Three baths are to be prepared for the reception of the plate, into which it must be passed successively.

1. The ordinary nitrate bath. 2. Distilled water. 3. Composed as follows:—

	Parts by measure.
Metagelatine solution	250
Syrupy lactic acid	5
Water	1000
Nitrate of silver	1 part.

The plate is to be left in No. 1 for 5 or 10 minutes, or till thoroughly sensitized. In No. 2 it is to be passed up and down just once or twice, not more, so as to wash off most of the adherent, but not the combined, nitrate. And in No. 3 it is to be kept for 5 or 10 minutes, frequently moving it about, so as to ensure an equal and complete absorption of the metagelatine solution. In cold weather, or if more intensity be desired in the negatives, 5 parts by measure of oxymel may be added to the above bath of diluted metagelatine. The reason why I employ the lactic acid is, that while it seems hardly to retard the sensibility, or to cause such intense blacks as the citric acid, it is not volatile like acetic acid; indeed, I believe it to be peculiarly suited for use in all dry processes, whether paper or collodion, as an efficient substitute for the more volatile acetic acid. On removing the plate from the metagelatine bath, it may be put, standing on its corner, in a dark place, and resting on a piece of blotting-paper, for a few minutes, and then placed in the drying-box. This box may be made of Honduras mahogany, or of poplar or lime-wood (*but not of deal*), and lined with paper,—several folds of blotting-paper being placed in the bottom, and a small cup in the centre, containing some oil of vitriol, which must be renewed from time to time. The affinity of the sulphuric acid for water keeps the atmosphere of the interior of the box free from moisture, and accelerates the drying of the plates considerably. The sulphuric acid also acts beneficially in purifying the air of the box from many other vapours and gases, as well as from watery vapour. Great care must be taken to keep the plate free from all gases, such as ammonia, chlorine, sulphurous acid, and sulphuretted hydrogen, and also from the vapours of turpentine and of all the essential oils. We should, therefore, scrupulously avoid preparing dry plates in the presence of emanations from stables, or of any organic matter in a state of decomposition; and, also, all the strong-smelling woods should be avoided when we wish to make a box for

storing plates away, and no varnish or drying oils should be brought near them. Let the plate dry completely before using.

5. *Exposure, development, fixing, &c., &c.*—The exposure must be regulated according to the system of development to be employed, whether it be by iron or otherwise.

For a stereoscopic plate taken with a Ross's landscape lens and a diaphragm of $\frac{1}{2}$-inch diameter, the exposure may be 40 seconds to 1 minute on a bright day, if it is to be developed with iron, or 3 to $3\frac{1}{2}$ minutes if developed with pyrogallic acid. I usually develope with sulphate of iron till all the details are brought out; and then, if requisite, it may be darkened by the application of a mixture of some pyrogallic-acid solution and nitrate of silver.

Formulæ of Mr. Hardwich.

1. Iron developer.
   Sulphate of iron......15 grains.
   Glacial acetic acid ....30 „
   Distilled water ...... 1 oz.
2. Pyrogallic acid developer.
   Pyrogallic acid ...... 1 grain.
   Glacial acetic acid......20 minims.
   Distilled water .... 1 oz.
3. A solution of nitrate of silver 1 per cent.

First pour a little water on the plate, so as to wet its surface evenly all over, and then, having laid it face uppermost on the levelling stand, pour on enough of No. 1. to cover it, and immediately pour this off again into a developing glass, into which you have already put a few drops of No. 3. Pour it on and off the plate in this manner till the picture is fully developed in all its details. As soon as this is the case, the picture may be held under the tap to wash away the remains of the iron solution, when, if necessary, the proof may be darkened by the application of No. 2 mixed with a little of No. 3.

In order to avoid the necessity of constantly weighing out the pyrogallic acid, a solution may be made in the proportion of 1 oz. of pyrogallic acid to 4 ozs. of alcohol: 4 minims of this liquid will then exactly represent 1 grain of the solid acid; and as the solution keeps indefinitely provided the alcohol be tolerably strong and pure, this method will be found very convenient.

Mr. Crookes was, I believe, the first to propose the use of alcohol to preserve gallic acid in solution, but it answers equally well for pyrogallic acid.

The proof may be fixed as usual with cyanide of potassium, or hyposulphite of soda, and then washed, dried, and varnished.

F. Maxwell-Lyte.

The proportions which I have given above are all stated in *parts*—not in any special weights or measures. Any operator may easily obtain the quantities in ounces by simple substitution of the word "*ounces*" for "*parts*" wherever the latter occurs; and if the bulk of the materials should be in this manner too much increased, it may be reduced to any extent by dividing all the numbers of each separate formula by any number which may be found convenient. It is greatly to be desired that all formulæ should be thus stated, as all trouble of changing English into foreign weights and measures would be avoided when processes were translated into the journals of other countries. I should wish it to be understood, that where I speak of a part by measure, I mean the bulk which is equal in volume to a similar part of distilled water. I mean to imply, a bulk of the liquid spoken of equal in volume to a given bulk of distilled water at 62°. Thus, supposing that parts be taken to represent ounces, then a fluid part will represent one fluid ounce; and if parts be taken to represent grammes or grains, then a fluid part will represent "a centimetre cube" of a minim respectively.

On the Metagelatine Process.

To the Editor of the Photographic Journal.

March 18, 1859.

Sir,—Having had several inquiries from photographers who are anxious to try the metagelatine process, as to the best collodion for the purpose, I should be much obliged by your inserting these few lines in your Journal. When so many practical chemists and photographers are giving their attention to the best method of manufacturing collodion, I feel very diffident about offering any remarks on the subject. My own experience leads me to believe that a very stable collodion, kept till the film becomes powdery, is better than a collodion manufactured expressly for the purpose to give a powdery film at once, as there is generally too much organic decomposition in the pyroxyline, and the collodion loses its sensitiveness very rapidly. I have found that a very glutinous positive collodion can be made into a very good collodion for the dry process by adding $\frac{1}{4}$ or a $\frac{1}{2}$ of old negative collodion to it, and putting pure metallic zinc into the bottle; in fact, by adding fresh pyroxyline and methylated ether to any old collodion, with the granulated zinc and some more iodizing mixture, a good collodion may be obtained.

Collodion for the dry process ought to contain at least $\frac{1}{2}$ alcohol, ought not to give too creamy a film, and the sensitizing (i. e. iodizing)

mixture should contain $\frac{1}{3}$ bromide. The older and more powdery the film gets, the more washing it requires.

All these hints seem to be given by rule of thumb; but I believe it is very difficult to give any exact formula for a collodion suitable to dry processes.

Stability and uniform action are the great requisites; and I have found that a collodion which had become the colour of sherry, when once its sensibility had been restored by means of metallic zinc, does not liberate iodine again so readily. I believe, therefore, that any person who has some old collodion can at once make good collodion for the dry process by adding new stable collodion iodized with cadmium and bromide of ammonium, and a few experiments will give the requisite proportions. Those who have not got any old collodion may make new collodion serviceable by a few drops of liquor ammoniæ, or by chloroform; but it will have to stand a few days, and a slight proportion of acid be used in the bath.

A really good negative collodion like Ponting's, kept till it is four or five months old, gives, however, the best and most certain results. In my formula for gelatine solution there was a mistake; it ought to have been, $\frac{1}{2}$ oz. gelatine to 10 ozs. water, and is best used warm.

For metagelatine solution take $1\frac{1}{4}$ oz. Nelson gelatine, dissolve in 12 ozs. water, and boil half an hour; add $1\frac{1}{2}$ drachm pure sulphuric acid and boil for another hour; then neutralize with chalk, and filter while hot through very fine filtering paper. For use, make up to 25 ozs., add 3 or 4 grains citric acid and 3 drachms alcohol; if wanted for keeping, add more alcohol. If the vertical bath is used for coating with gelatine, very little alcohol ought to be used. Honey is of little or no use to add to the metagelatine, and is often the cause of stains.

One word to encourage amateurs to try the metagelatine process. I found in a fortnight's experimentalizing that I could produce better pictures than I could with the wet, and have never found any difficulty since. Always over-expose rather than under-expose, and develope at first with very little nitrate. Fix with cyanide. A negative is almost sure to be denser in printing than it appears to the eye. I believe drying the plates in an oven to be an important point to prevent blistering; and the gelatine ought thoroughly to be washed off with hot water previous to development. Distilled water ought to be used in washing; either hard or soft water often producing cloudiness, from organic or inorganic matter. I have been trying some experiments in developing with iron and citric acid with a very small proportion of nitrate added, and will publish the results shortly, as I find I can develope by this means nearly as quickly as an ordinary wet collodion negative; and if, after washing and drying, it is not intense enough, it is still easy to add to the intensity by means of pyrogallic and nitrate; and it produces much softer pictures.

Excuse many of these observations being old and often repeated; but I have been induced to send this letter owing to the questions which have been asked me, and also because I find, in the list of photographs shown in your Society's Exhibition this year, so few comparatively are done by the dry processes; and I am perfectly convinced that for five subjects out of six, the dry-collodion processes may be made as effective as the wet. I don't find Fothergill's process any more, if so sensitive as the plan I have adopted; and even should there be an albuminate of silver formed in the film, I have yet to learn that an iodized film can be made more sensitive by adding a less sensitive film to it; and a pure albuminate of silver is very insensitive, which is an experiment any one can make for himself by coating a glass with pure albumen and sensitizing in a strong neutral negative bath.

C. P. Cleaver.

Photography applied to Engraving.

To the Editor of the Photographic Journal.

47, Camden Street.

Sir,—Photography, as it progresses, opens up new fields of utility in the fine as well as in the industrial arts; the more the art is known, the more likely will it be to prove a useful adjunct to many occupations. Amongst the numerous ingenious adaptations of photography to various purposes, there is one, so far as I know at present, that has not been made public, namely, as a help in the process of engraving on steel or copper.

Without the most remote desire to depreciate the results of the various processes of engraving on stone, or steel, or copper, by the agency of light, any one acquainted with the works of celebrated artists (engravers on copper or on steel) will at once admit that light cannot achieve those results which the graver in a skilful hand can effect.

Engraving by light, and engraving by the graver, possess totally different qualities—each style being admirable in itself: that which light effects, charms by its truthfulness; that which the graver produces, charms by its qualities, textures, gradations, skilful management of lines, and compensations for colour.

No photographic negative taken from a finely-coloured picture would give a positive possessing the qualities of an engraving after such a picture by Bartolozzi, Doo, Watts, Robinson, Cousins, and other eminent engravers. The photographic print would be more like the picture than the artist's engraving; but for brilliancy of effect, variety in the textures, and qualities understood and felt by engravers and collectors, the artist's work would be preferable.

Colour, especially yellow, and compounds with much yellow in them, photography cannot give; while blues, violets, and their relations come off with surprising energy.

These remarks, brief as they are, upon a subject so extensive, are merely made to justify the assertion that photography will never entirely supersede the art of engraving, as practised by the eminent artists of England, France, Germany, and Italy.

In considering this question, the application of photography to the reproduction on a small, or even on the same scale, of fine engravings, must be set aside, as the question lies between the results of light and the results of the graver, produced from the picture itself. The enthusiastic photographer, unskilled in art, would naturally consider light and chemical means as superior to any other mode of depicting, after nature or after pictures; but that, art-education teaches us, is not the fact.

It is, indeed, a difficulty to enter at all upon this question without being seduced into a long treatise upon the difference between art and imitation; and even supposing this done, the love of truthful imitation, especially that of photography, is so powerful, that to many the labour would prove in vain.

Photographers will point to the prints in the late Exhibition done after the celebrated Cartoons of Raffaelle, and ask, with triumph, whether their truthfulness can be surpassed? The answer is, certainly not. They are most surprising and valuable as records, and truthful records, of those great works; they have all we want to see, and a great deal more; even the dirt, the cracks, foldings, and joints of the paper are given with scrupulous fidelity and Chinese accuracy. These are the accidents, the blemishes; they constitute no part of the divine Raffaelle's reputation, and, were it possible in photography, had better have been omitted.

The half-tints are not as Raffaelle left them even in the Cartoons themselves, and have suffered from the very nature of photography. Still more: after all the disadvantages (miscalled beauties by lovers of mere imitation), these photographic reproductions are highly valuable, and owe their origin to the piece-meal process introduced by Mr. Rejlander.

This method of taking parts of a picture, and joining the pieces skilfully together, has greatly increased the value of photography and enlarged its application. While photography was confined to the production of the entire subject on one plate, such as those large and exquisite productions of Bisson of the architecture of Paris, it was of necessity slow in operation, troublesome to carry out, very expensive in the materials, at all times difficult of manipulation, and, in consequence, costly to purchase copies of such works. Recent photographic pictures having been built up piece by piece, have done good service to the art, and removed the impediments formerly existing to the successful carrying out of the suggestions which form the subject of this communication. All who have had access to the studio of an engraver must have observed the tedious process gone through, called squaring, with every picture which has to be engraved. The sides and top and bottom of the picture are divided into certain spaces, into each division pins are driven, and fine threads stretched from side to side, from top to bottom; thus the entire picture is divided into hundreds of small squares, some a quarter of an inch in size.

The next step is to divide a sheet of paper into squares, according to the scale of the engraving, corresponding with those squares on the picture; and then, by a most careful, tedious, and elaborate process, draw in pencil the outlines of the subject. These obtained, with the outlines of all the forms, including those of the shadows, the drawing, or *reduction* as it is called, is then fastened firmly to a plate prepared with an etching ground; the two are then passed under a rolling press, and thus the reduced drawing is made to transfer its lines to the plate: this is called rolling off. After this the etching commences, then the biting in; the graver now comes into use, and thus a line engraving is produced, after a lapse of some years. It is to shorten the process, by superseding the squaring, and even the reduction, that photography may be profitably employed. Hitherto size has been the impediment to its use; but now that practice has been had in building a print up piece by piece, no obstacle exists to saving the engraver many months of close drudgery.

In a manner similar to that employed to reproduce the Cartoons, an exact paper copy of a picture upon the required scale might be made, whereby all the labour of squaring and reducing would be saved to the engraver.

By tracing over the forms with a pencil, the

design could be rolled off at the press, the engraver's work then going on as before.

For plates small enough to go into a camera, the collodion could be laid on the etching ground itself, protecting the rest of the metal from contact with the bath by means of etching ground, and a negative obtained on the plate at once; upon this varnished negative picture the engraver could etch, and in this way a great saving of time would be effected. The expense of the operation need not be great, because those photographers who possess lenses which will give pictures such as the Cartoons, have the means at hand.

For the engraver's purpose almost anything with a correct outline would answer: tone, evenness of tint, colour, whether black or sepia, freedom from comets and spots, all are of no importance—a failure could scarcely take place.

Portions of a picture thus obtained could be accurately joined and applied to the plate in another manner—that of rubbing the back of the print with vermilion or black-lead, and tracing the forms down upon the etching ground by means of a hard point; but these matters belong to the engraver.

Let photography produce for the artist an accurate reduction to scale, the engraver will know how to avail himself of it.

How far the printing process could be applied to the plate itself, is a mere matter of experiment; for photography is applied to wood, cloth, leather, glass, china, and to varnished iron plates. It would, therefore, appear easy to print on a steel or copper plate, which would then be ready for the etching needle to commence operations.

If these suggestions should abridge the labour of the engraver in the early stage of his work, a very useful application of the delightful art of photography would be found; and no doubt can exist that the talent and ingenuity of photographers would readily overcome any little difficulties which might at first present themselves.

R. W. Buss.

Notes on the Alabastrine Process.

(Recently read before the Scottish Photographic Society by Mr. J. Traill Taylor.)

This process owes its origin, in all except its present name, to the late Mr. Scott Archer. It dates at least half a dozen years back. It consists in merely whitening an ordinary collodion positive by one of the salts of mercury. To produce the most perfect results, it is important to employ suitable collodion. A *negative* collodion, or one capable of giving a dense deposit of silver in the lights, is required. The specimens I now submit to your inspection, and in which you will see that the whites are of the most faultless purity, were produced by an old negative collodion, previously diluted with spirits of wine until the proportion between it and the ether was about half-and-half. *Pure* alcohol has been recommended for most photographic preparations; but in this it will not give such good results as can be attained by using common methylated spirit, which costs from 3*d.* to 4*d.* a gill.

The developing solution is the ordinary iron one. The picture most suitable for the subsequent whitening should be very forcible and vigorous, with considerable density in the lights and not too much half-tone. When fixed and properly washed, it should not be allowed to dry, but should be placed on a stand, and a solution, made as follows, poured over its surface.

Nitric acid	2 ozs.
Muriatic acid	1 oz.
Saturate these with bichloride of mercury, then add methylated alcohol	2 ozs.
Water	7 ozs.

This may darken the picture at first; but in a few minutes the whites will assume a clear pearly hue. The full effect is produced in from five to thirty minutes, depending on temperature, &c. It must now be carefully washed and dried. The varnish I have found most suitable is mineral naphtha containing a very small quantity of Canadian balsam. The strength of this should be such, that while it gives a fine glaze to the blacks, it should be quite absorbed by the whites. Very little experimenting suffices to attain the desired thickness. If colours are to be applied, they should be done with care, as they adhere very tenaciously. A thick body-varnish applied after colouring, while it destroys much of the beauty of the picture, causes the colour so to penetrate the film, as to become visible on the reverse side of the plate.

A positive picture taken by this process can at any time be turned into a dense negative, by pouring over the surface a weak solution of sulphide of ammonium or hyposulphite of soda.

"The Fothergill Process."

To the Editor of the Photographic Journal.

Sir,—As the "Fothergill" appears likely, on account of its simplicity, to supersede the various honey and raspberry-vinegar processes, I think it may be of use to ascertain the real value of

information given respecting its manipulation and theory, so that we may keep the good, and cast away that which is useless and unprofitable.

Many letters have appeared in your Journal, purporting to direct the novice to the desirable goal of "certainty."

A gentleman, signing "A. Keene," appears to be leader of the van, and to consider himself the true elucidator of the process; and it is to his letters I would wish more particularly to call attention.

I will ask, then, 1st, Is it imperative to use the mystic proportion of 4 drachms of water, and allow it to remain for the magic period of 15 seconds? Mr. Prichard uses one-third more water for first wash, and does not lay peculiar stress upon the quantity. 2nd. Must we, after albuminizing our plate, still measure with religious accuracy the very water to wash off the superfluity?

Mr. Prichard, after albuminizing, pours on (in a heathenish manner) a large quantity from a jug, and yet promises success.

Which is right?—and if there is no difference, why perplex the brain of youthful photographers (I speak feelingly for myself) with useless minutiæ? Surely there are sufficient powers of darkness to grapple with in the recesses of the developing closet, without being crippled with a measure in one hand, and a watch (if not at "my uncle's") in the other. Calling peculiar attention to trifles is apt to remind one of "the mountain in labour bringing forth a mouse." I would ask also—

1. Are not the requisites for a sensitive surface a film of iodide, or bromide, &c., + free nitrate of silver?

2. Does not the superior sensitiveness of the wet process consist in the fact of more nitrate being present?

If yes will answer these questions, it will be clearly seen that when Mr. K. tells us "he finds washing with 3 or 2 drachms, instead of 4, increases the sensitiveness, but diminishes their keeping qualities," he is simply echoing the experience of past ages, and in reality does not add one jot to the amount of previous knowledge on the subject.

With regard to the chemistry of the process, or the so-called *modus operandi* in the Journal for Nov. 22, 1858, the inferences deduced from the experiments appear to me so erroneous, that it is high time they were examined; and I have been hoping a more able person would take the matter in hand; such not being the case, it is with diffidence, and solely with a wish to get at the truth, that I now trouble you.

I will take the queries and experiments (as in the Nov. 22nd Letter) *seriatim*, and begin with Nos. 1 & 2. "Does combination take place between the albumen and silver?"

"If so, is it chemical or otherwise?"

"The following experiments will prove this must be the case:—

Exp. 1. "Mix solutions of nitrate of silver and albumen diluted, a precipitate will fall; dry a portion in the dark at about 120° F.; expose some of this, and also some of the moist to the light; both will change to a chocolate, the moist sooner than the dry."

Here, evidently, nothing more than discoloration is proved, which would be produced by the chloride, phosphate, or carbonate of silver formed by the impurities of the albumen; it is needless to add, moist chloride is more readily acted upon in the light than the dry.

Exp. 2. "Rub another portion in a mortar with distilled water, to consistence of thin cream, add it to concentrated hydrochloric, sulphuric, and nitric acids; a precipitate similar in appearance to original is obtained, but more tenacious, which, when exposed to the light, is still acted on, but less quickly."

If I understand rightly, "another portion" refers to the precipitate mentioned in Experiment 1. Now, if formed before the addition of acid, I am at a loss to conceive how it can be said to be obtained afterwards; moreover, nothing is gained by the experiment, because we know albumen is precipitated from its aqueous solution by acids; and as to the darkening, I think I shall be able to show it is caused by the admixture of chloride of silver.

Now for the other part of the experiment:—

"After the other part has stood a few hours, filter and preserve the clear liquid; this will be found to have the metallic taste of silver, with that of the white of a very fresh egg boiled until not quite set."

Any one having to wash free nitrate of silver out of a curdy or spongy precipitate, will soon discover it to be a difficult and tedious operation; and probably the "metallic taste," in this instance, was owing to imperfect washing; as to the other taste, I must exclaim, with the patriarch Job (vi. 6),—"Is there any taste in the white of an egg?"

"The above experiments," Mr. Keene asserts, "answer both the first and second queries; for they not only show that there is a union with the nitrate of silver (?), but that it is a chemical one."

This inference, I maintain, is erroneous.

3rd Query. Can there be such a thing as albuminate of silver?

"The reply must be in the affirmative, shown as follows:—

"Exp. 3. Precipitate oxide of silver from a solution of nitrate by lime-water; wash, and

place some in distilled water, and let it remain several hours, &c., filter, and add albumen: an opacity, or slight milkiness, will soon be apparent, &c. . . . . This may fairly be called albuminate of silver. This, however, I do not think is the compound produced in the Fothergill Process."

The decompositions of this experiment may, I think, be explained thus:—

Oxide of silver is slightly soluble in water; and the albumen contains chloride of sodium, &c.: 1 equivalent of silver combines with 1 of chlorine from the chloride of sodium; and the equivalent of oxygen thus liberated combines with the equivalent of sodium, as seen by the symbols:—

$$\begin{matrix} Ag & O\text{——}HO \\ Na & Cl \end{matrix}$$

or, $AgO + NaCl + HO = AgCl + NaO, HO$.

This explanation is only a suggestion, and will form a fair point for attack. The experiment made with pure albumen would prove the truth at once; but I have not had time to try it: my reason for thinking chloride, and not albuminate of silver, is formed, is based upon the principle that the more unstable salts are not formed in the presence of strong acids and bases.

4th Query—Does albumen act merely by apposition?—

"Is theoretically answered negatively by previous experiments, but practically, I think, not entirely so."

This remark is beyond my comprehension; and I must leave it, not knowing what is meant; but when we are told "that a 35-grain solution of nitrate of silver dropped into prepared albumen is only precipitated where they first come in contact," I own I am amused with the simplicity (which is always charming) of the remark. One of the first principles of chemical action is, that combination only takes place between atoms at insensible distances. I am at a loss to see how this noble experiment can be applied to the process; but then this want of perception is most likely my misfortune, in not being able to understand "the formation of a highly sensitive chemical compound, which also mechanically retains a portion of free nitrate of silver excluded from the action of the atmosphere in the pores of the collodion film." If Mr. Keene, whose acquaintance I do not enjoy, would kindly enlighten me, I should feel greatly obliged.

Some remarks, signed by "Amateur," appear, in my humble opinion, far more correct, and calculated to throw light upon the theory of the process. He says—and I think with truth—that no albuminate of silver (or, as Mr. Keene would call it, "albumino-nitrate of silver") is formed. My reason for agreeing with him is based on the following experiment:—

If we mix solutions of albumen and nitrate of silver, and thoroughly wash the precipitate formed with hot distilled water, then treat a portion of it with boiling concentrated nitric acid, we find the greater part is dissolved, or, more correctly speaking, decomposed; there remains, however, a curdy precipitate, which we find to consist of chloride of silver. Now it is clear that, if any albuminate of silver was present in the original precipitate, it would be decomposed by the nitric acid, giving rise to nitrate of silver, which would be found in the filtrate: but, on adding hydrochloric acid no precipitate is formed; therefore we may conclude that, upon mixing solutions of albumen and nitrate of silver, we obtain a precipitate consisting of coagulated albumen and chloride (and phosphate and carbonate, which are not called in question) of silver; and of course the reaction would be alike on the sensitive plate and in the test tube.

The "moral," then, I would deduce, is, to try and render a simple process, if possible, still more so, and to divest the mind of all useless minutiæ, and, above all, erroneous theories.

Lastly, if I am wrong in my conclusions, no one will be more glad of correction than

James Baly.

P. S. There are many more points for discussion in Mr. Keene's letter, but I fear mine is already too long; and therefore I cannot notice them now.

Proposal to test Lenses.

To the Editor of the Photographic Journal.

Sir,—The proposal advanced by Mr. Hardwich at the last meeting of the Society I think a most excellent one; at the same time I am afraid the Council of the Society have undertaken a most extensive task. If I understood Mr. H. aright, his proposal was merely to test and pronounce an opinion upon his method of making photographic pyroxyline: whether, by making it with the best cotton wool and with a large excess of diluted sulphuric acid, a most uniform, fluid, and stable collodion could not be made, independent of any variety in the ordinary temperatures, or the proportions of the solvents or of the iodizers; and whether by this method a most perfect cure is not offered to all the faults of collodion, namely, reticulations, networks, crapiness, &c., &c.

There is, however, another task which I beg to submit to the Society, which I am sure all photographers would hail with pleasure,

namely, to undertake to pronounce an opinion on the qualities of the various competing lenses now in the market. All photographers have not the means of purchasing all the various advertised lenses, for the purpose of testing which works the sharpest, the quickest, and gives the greatest distance least out of focus. There are now no less than three Petzvals by celebrated makers—his own optician, Voigtlander, and our own countryman Ross. I have heard it whispered (I will not say with what truth) that that by Ross is superior to that of Petzval's own optician; if such is the fact, it would be fair to the public to let it be known. We have, besides, the patent lens of Mr. Grub, which is advertised to do greater things than any: a fair comparison with the others would settle the point. A Committee of several of our first photographers would soon be enabled to pronounce an opinion, and their trial might be exhibited for the satisfaction of the photographic public.

Francis G. Eliot.

Cemented Achromatic Lenses.

To the Editor of the Photographic Journal.

Feb. 14, 1859.

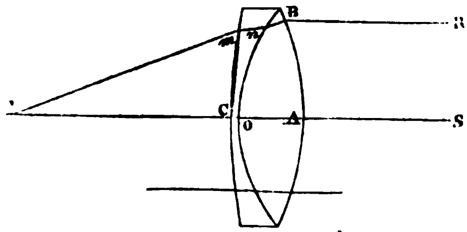
Sir,—I enclose the table of aberrations for cemented lenses, with an explanation of a new mode of computing it, and place it at your service.

J. T. Goddard.

It is perhaps a singular but fortunate consequence of the simple law of refraction, that regulates the transmission of light through lenses, that the important effects of colour, aberration, and confusion admit of being considered and rectified independently of each other, and from this circumstance calculation is much facilitated. Colour and aberration affect the formation of images in the axis; but these, with the peculiar effect termed confusion, have their influence in modifying the formation of images remote from the axis.

I proposed, in my last communication, to give the aberrations for a series of cemented lenses; and as these were computed by a process that gave the several deviations of the ray in its passage through the lens, besides the final aberration, it might be as well to describe it.

Let ACB represent a double object-glass of similar interior curves, exposed to parallel rays: when the refracted ray m F intersects the axis of the lens at its principal compound focus, the lens is said to be aplanatic, or without aberration; when it falls short of it, there is *positive* aberration; and when it extends beyond the principal focus, there is *negative* aberration.



Our business is, therefore, to trace the ray R B through its successive deviations as it passes through each surface. It is easily seen that it will have three *deviations*: the first at B, the second at n, the interior surface, and the third at m, the point of emergence; then there will be three *courses*, viz. the course of the ray within the first lens B n, that within the second lens n m, and that pursued by the ray after emergence m F. There will also be three *incidences*,—the first (the most properly so called) at B, then at n and m: and in working the calculation it is convenient to have a term to designate the angle at which a line drawn right through our section of the lens, parallel to the axis, and at any given distance from the axis, would meet the first, second, and third surfaces. I have chosen the term *curvity* for this; so that the curvity is nothing when the line is coincident with the axis and increases as the distance from the axis increases. We shall have to determine the curvity for the first, second, and third surfaces, for a line drawn through the point of incidence, having a given distance A B from the axis; and as we are neglecting for the present the effect of *thickness*, n and m, the last two points of incidence, are taken as equally distant from the axis with B: hence our determination will only be approximate. If we took the trouble to discover the slight diminution of distance that the ray undergoes in its transit from surface to surface, and entered these distances for the second and third surfaces when computing the curvity, the result would be perfectly accurate. In the discovery of the deviation, the refracting angle is the actual result that arises, and the deviation is found by taking the difference between the angle of refraction and the angle of incidence. It will be convenient to adopt the following abbreviations:—Rad., radius of lens; surf., surface; inc., incidence; ref. in., refracting index; relat. in., relative index; dist., distance from axis; log., logarithm.

The term *mean curvity* will apply to the average curvity between any two points in the surface of the lens: thus the inclination of the chord c m is equal to the mean of the curvity

for c and that of m; and the curvity being nothing at c, the mean curvity between the given points will be half the curvity at m.

The values of the several quantities will be as follows:—

Refractive index plate glass=1·510 and its log ·178977.

Refractive index light flint=1·580 and its log ·198657.

Relative index, from plate to flint$=\frac{1·580}{1·510}=1·0464$ and its log ·019681.

Distance ray from axis A B=1·5 in. log ·176091.

Curvity, its sin$=\frac{\sin 90° \times \text{dist}}{\text{rad surf}}$

1st incidence=1st curvity, since the direct ray R B is parallel to axis.

1st deviation=the difference between the angle of incidence and the angle of refraction, the sine of the angle of refraction being$=\frac{\sin \text{inc.}}{1·510}$

1st course=to the 1st deviation, since the incident light is parallel to the axis.

2nd incidence=2nd curvity increased by the 1st deviation in the case before us.

2nd deviation=to the difference between the 2nd incidence and the 2nd refracting angle, the sine of the latter being$=\frac{\sin \text{2nd inc}}{1·0464}$. This deviation is from the axis.

2nd course=to the difference between the 1st and 2nd deviation in the case before us, and its direction towards the axis.

3rd incidence=to the sum of the 2nd course and 3rd curvity when the 3rd surface is convex, but the difference when the surface is concave.

3rd deviation=the difference between the 3rd incidence and the 3rd refracting angle, the sine of the latter being=sine 3rd inc×refract index flint.

Total deviation=3rd deviation plus 2nd course.

Mean curvity=½ the third curvity.

Angle F m C=90° minus the sum of the mean curvity and total deviation when the surface is convex, but 90° minus the difference between the mean curvity and the total deviation when the surface is concave.

Focus of extreme rays=

$$\frac{\text{secant mean curvity} \times \text{dist} \times \sin \angle\, m}{\text{sin total deviation}}$$

Focus of central rays=refractive focus of convex and concave lens multiplied together and divided by their difference.

Aberration=to the difference between the focus for extreme rays and that for central.

We will illustrate the working of the formulæ by taking a particular case, say the lens or compound in the table whose aberration appears a minimum. That case gives us the following data:—Radius of outside of plate lens 8·2 in. convex; radii of interior surfaces 5·049 in.; radius of outside of flint 108·1 convex.

The aberration being supposed to be unknown, it is required to find it, for a ray 1·5 in. from the axis. We have—

$$\text{Geo focus plate lens}=\frac{8·2\times5·049\times2}{8·2+5·049}=6·25.$$

$$\text{Geo focus flint lens}=\frac{108·1\times5·049\times2}{108·1-5·049}=10·593.$$

The proportion of these two foci 59 to 100 sufficiently satisfies the condition for coincidence of the visual and actinic rays for photography, with the materials in question, though for a telescope it would require to be nearly 62 to 100. The radii in the table have been so computed as to produce exactly the same foci as those just shown, and consequently the refractive and compound focus of each lens will be the same, viz.—

$$\text{Refractive focus plate lens}=\frac{6·25}{\frac{·510}{·500}}=6·1274 \text{ inches.}$$

$$\text{Refractive focus flint lens}=\frac{10·593}{\frac{·580}{·500}}=9·1319 \text{ inches.}$$

$$\text{Compound focus}=\frac{6·1274\times9·0319}{9·1319-6·1274}=18·624.$$

These foci, therefore, are common to each lens and compound in the subjoined table. In accordance with the formula we proceed with the logarithmic computations.

Log dist + log sin 90°	10·176091
Log rad 1st surf	−·913814
	9·262277

This is sine of 10° 32′ 25″ the curvity and inc

Sine inc	9·262277
Log ref in plate lens, air into glass ...	−·178977
	9·083300

	° ′ ″	
This is sine of	6 57 29	the refrac. ∠
Inc	10 32 25	
1st deviation ...	3 34 56	towards axis.

Log dist + log sin 90°	10·176091
Log rad 2nd surface	−·703205
	9·472886

	° ′ ″	
This is sine of	17 16 58	the 2nd curvity.
1st deviation...	3 34 56	
2nd inc	20 51 54	

Sine 2nd inc	9·551654
Log relat index, rarer into denser ...	−·019681
	9·531973

	° ′ ″	
This is sine of	19 54 2	the 2nd refrac ∠
2nd inc.........	20 51 54	
2nd deviation ...	57 52	from the axis.
1st deviation ...	3 34 56	towards the axis.
2nd course	2 37 4	

Log dist + log sin 90°	10·176091
Log rad 3rd surface	−2·033826
	8·142265

	° ′ ″	
This is sine of	0 47 42	the 3rd curvity.
2nd course	2 37 4	
3rd inc	3 24 46	

Sine of 3rd inc	8·774728
Log ref in flint lens, glass into air ...	+·198657
	8·973385

	°	′	″	
This is sine of	5	23	49	
3rd inc	3	24	46	
3rd deviation...	1	59	3	towards axis.
2nd course......	2	37	4	
Total deviation	4	36	7	and ∠ at F.
Half 3rd curvity		23	51	or mean curvity.
	4	59	58	
	90	0	0	
∠ *m*.	80	0	2	or F *m* C.

Secant mean curvity	10·000010
Log dist	·176091
Sin ∠ *m*	9·998344
	10·174445
Sine total deviation	—8·904352
	1·270093

This is log of	18·625	focus outside rays.
Ref focus ...	18·624	
Aberration	·001	

Having illustrated the mode of finding the aberration, I subjoin the table computed by the same means:—

Radius of plate lens convex.	Radii interior surfaces.	Radius outside of flint.	Focus of rays 1·5 inch from axis.	Aberration.
Inches.	Inches.	Inches.	Inches.	Inches.
6·0	6·523	28·19	18·171	·453
6·2	6·301	33·23	18·236	·388
6·4	6·106	39·92	18·296	·329
6·6	5·935	49·22	18·349	·275
6·8	5·782	63·05	18·397	·227
7·0	5·645	85·78	18·438	·186
7·2	5·522	130·0	18·477	·147
7·4	5·409	254·0	18·514	·110
7·622	5·297	Plane.	18·546	·078
7·8	5·214	334·0	18·574	·050
8·0	5·128	161·3	18·601	·023
8·2	5·049	108·1	18·625	·001
8·4	4·976	82·29	18·649	·025
8·6	4·908	67·02	18·669	·045

Central pencil, 18·624, focus for thin lens; ratio of geometrical focus of plate and flint, 59 to 100; index of plate, 1·510; ditto flint, 1·580; radii of flint in 3rd column concave above the word Plane and convex below.

J. T. Goddard.

On the Fading of Positives.

To the Editor of the Photographic Journal.

Bagnères de Bigorre,
March 7th, 1859.

Sir,—On perusing my late communication with regard to the fading of positives, I fear that I hardly conveyed a clear notion of the theory I had formed on the subject, in that I have laid too great stress on the action of carbonic acid, as if its presence were essential to the change described, whereas I only desire to hint that it may possibly accelerate that change, which would equally proceed, though more slowly, without it.

I see also that through an omission (whether on my part or on that of the printer I know not), the last sentence of the same letter has been left unfinished, and is consequently without any meaning. After washing away all traces of the copper salt from the proof, I desired to add, that a dilute solution of the hydrosulphate of ammonia should be poured over the face of the picture, which at once changes from white to a fine bistre; after which it may be washed and dried, and is, as far as I have been able to see, permanent.

It is not improbable that the above treatment might soften and improve some negatives.

F. Maxwell-Lyte.

South Kensington Museum.

An important collection, lent by Mathew Uzielli, Esq., of antique and other engraved gems and cameos, is now to be seen in the Museum, South Kensington.

It comprises nearly 500 specimens, many of great excellence and value, including upwards of 350 of those recently dispersed at the sale of the Hertz Collection. There are examples of the best periods of Greek and Greco-Roman work, also some of the Cinque-cento in settings of the time.

The reception, on loan, of fine works of art, from private persons who are willing to give the public some benefit from their collections, is a characteristic of the Museum of Art at South Kensington.

GLASGOW PHOTOGRAPHIC SOCIETY.

Regulations of Photographic Exhibition to be held in the Gallery, No. 67 Buchanan Street, during the month of April, 1859.

Every description of photographic pictures will be admissible; but not more than twenty portrait specimens to be admitted from any one exhibitor. It is recommended that all pictures be framed and glazed. The name of the subject, the process, the artist, the owner, and if for sale, the price, to be marked upon the back of each picture.

A list of the photographs sent must be enclosed in the case, and a duplicate list forwarded by post to Mr. Barr, the acting Secretary, No. 1 Renfield Street, Glasgow.

Pictures touched by the brush to be so described.

A commission of 10 per cent. will be charged upon all sales of pictures.

It is requested that all works intended for exhibition be sent, carriage paid, to the rooms, No. 67 Buchanan Street, on Friday the 25th, or Saturday the 26th, March; and at the close of the Exhibition they will be carefully re-packed, and returned carriage free.

A. A. Ferguson, } Joint
John H. Barr, } Secs.

ANSWERS TO CORRESPONDENTS.

A Beginner (*Bristol*).—To avoid getting the hypo on your fingers, you will find it convenient to have a second bath, made with a saturated solution of hypo, and plunge your picture into it in the same way as you do the collodion plates into the nitrate bath. As the bath becomes consumed by waste, fill it up, but do not throw away the old solution. By long immersion in such a bath, you will find it will intensify a picture, and convert an over-exposed or faint negative into a good printing plate.

P. (*Teheran*).—Your communication, with the enclosures of photographic views of ruins from Persepolis and the residence of the Russian Ambassador at Teheran, have been received. Endeavours shall be made to accomplish your wish through the means of the Foreign Office.

H. Gwdvic (*Mourtrath*).—Not only was the Journal sent, according to your request, but on the receipt of your letter our Publishers sent duplicate copies; your own postage stamps, however, have not come to hand. Observe, the address should be Red Lion *Court*, Fleet Street, E.C., not Red Lion *Square*, W.C.

W. B. (*Salisbury*).—1. A solution of sugar-of-milk will have much the same action as whey or serum of milk. 2. You should use glacial acetic acid, which, if of the proper strength, should become solid like ice at a temperature of 50°. 3. You may use the dish you describe; but glass dishes are now to be procured very cheap, made without join. 4. Several friends speak well of the turpentine-paper process; but we have not ourselves had actual experience to give you the information you require. For calotype pictures, certainly, Turner's paper is to be depended on.

Iris.—Beyond the communications in past Numbers of this Journal, we can give you no information on the subject of colour naturally produced in photography. We have now before us, however, a valued specimen, taken in the year 1852, in which at least five tints are naturally represented. At that period, soon after the introduction of collodion, and when positives on glass were much sought after, such productions were not unusual. Then the chemicals employed were often home-made, and, no doubt, were subject to much variation. In the collodion used upon this particular specimen, fluoride of potassium was used, as well as iodide and bromide. There was also a small portion of arsenic, which some writers about that time had recommended as producing particular results. The arsenic was combined in the form of arseniate of quinine, a substance used in medicine.

J. W. B.—For the means of taking instantaneous pictures, we must refer you to our back Numbers. One of the best pictures of this sort was exhibited at the late Exhibition (No. 290) by Mr. Downes, of the Photographic Institution, New Broad Street.

F. R. Moultrie (*Bengal*).—A Member of the Photographic Society residing abroad does not pay an annual subscription to the Society. The Journal is supplied gratuitously during the first year, but not afterwards. Your request shall be attended to.

J. M. S. B.—"Sir,—In preparing some Fothergill plates the other day, I used albumen prepared with ammonia. The albumen solution had a milky appearance, though well filtered; and the pictures were covered with a number of very small transparent spots on developing.

"I have prepared a number of plates before with albumen and distilled water only, which gave beautiful results. Therefore I would be glad to know—

"1. If there is any real advantage in using ammonia, and if it always makes the preservative solution milky-looking.

"2. I see both resin and ammonia recommended for making a short collodion. Do you recommend either? Will the ammonia not make the film crack?

"3. A saturated solution of salt is recommended for giving extra sensibility to the collodion. Is the salt to be dissolved in water, or alcohol? and is there no better substance for the purpose? A very sensitive collodion is most desirable for the dry process, even though it had no keeping properties (before using), as it might be made as it is wanted.

"By kindly answering these queries, you will much oblige your subscriber from the first,

"J. M. S. B."

1. You will be successful by simply using the albumen and water.

2. There is no doubt but that collodion which is the most sensitive used wet, also retains the same qualities when used dry. A porous collodion has always been recommended for the various dry processes; but recent experiments seem to prove that, if the ordinary collodion retaining some tenacity be used, much more rapidity of action is secured. There is, however, a difficulty in causing it to adhere sufficiently to the glass; and this has been remedied to a considerable extent by running round the prepared dry plate a narrow edging of a solution of gutta-percha.

3. In our own hands, the use of iodide of ammonium with a small portion of bromide, say 1 grain of the latter to the ounce, has produced all the rapidity which has been required.

We are indebted to Sir J. Joscelyn Coghill, Bart., Vice-President of the Dublin Photographic Society, for a very interesting account of his photographic tour on the coast of Spain; a wish to give it to our readers intact renders it needful to postpone its appearance until our next issue.

Notice of Stereoscope waiting for the woodcut.

The length of the Report of the Proceedings of the Photographic Society of Scotland renders it needful for us to postpone several Correspondents until our next Number.

Letters of inquiry to the Editor can only be answered through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. Taylor and Francis, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 82. APRIL 9, 1859.

PHOTOGRAPHIC SOCIETY, LONDON.

ORDINARY GENERAL MEETING.

APRIL 5, 1859.

CHARLES B. VIGNOLES, Esq., F.R.S., V.P., in the Chair.

The Minutes of the last Meeting were read and confirmed.

JOSIAH SPODE, Esq., of Hawkeyard Park, Staffordshire, was elected a Member of the Society.

Mr. Sutton, of Jersey, exhibited a model of a boat built for photographic purposes, and the Secretary read a communication thereon to the Society as follows:—

Jersey, April 2nd, 1859.

Description of the Model of a Photographic Boat.

Photographic travelling vans, of various forms have been constructed, in which a photographer, together with a friend or assistant, could live as they journeyed from place to place; but I do not remember to have seen any account of a PHOTOGRAPHIC BOAT, in which one or two photographers, and a waterman, could spend a few weeks in the summer months, living entirely on board, and taking views as they navigated a river, lake, or estuary.

The model exhibits a three-masted schooner constructed for the above purpose, and provided with two cabins, one for the man, the other for the photographers. She is contrived so as to draw very little water, to row or tow easily, and at the same time sail well, if required. Her length is 40 ft., breadth 7 ft., and draught of water from 1 ft. to 2 ft. 6 in., as required. The bottom is everywhere flat transversely, but has a sheer longitudinally. The sides are upright like those of a box. The ends are symmetrical. The draught of water depends on the depth of the false keel, and is reduced to 1 ft. if that is removed. The masts can be lowered or taken down when passing under a bridge.

Although the construction is peculiar, yet it is such as can be proved to combine great stability under canvas, with power of holding a good wind, if sufficient depth of keel is given to the boat; and in consequence of the sharpness of the bow and stern, 8 or 9 knots an hour could be got out of the boat in a tolerable breeze. The mode of construction is also very economical, since no curved timbers are required,—all the wood being straight, and the upright sides bolted to the floors with iron knees.

The cost of such a boat, built of the best materials and in the best style, would not exceed £50.

THOMAS SUTTON.

Messrs. Burfield and Rouch exhibited a registered tent and a new folding camera of ingenious construction, with a Ross orthographic lens. It consists primarily of a light box about 1 foot 8 long by 14 inches square, having the top and one side hinged, and mounted on a firm tripod. By means of a couple of slender rods and light proof covering, it can be instantly converted into a room large enough to work 12 x 10 plates with ease: light is admitted through a pane of orange-coloured glass placed in front, and an aperture at the top ensures perfect ventilation. When not in use, the whole of the apparatus required on a journey can be packed inside. The extra weight of the covering is about 5 lbs.

The CHAIRMAN said that, speaking from his own experience, having been in many parts of the world, travelling by boat was a very pleasant mode of travelling, to say nothing of the advantage of carrying photographic apparatus in that way.

The Secretary then read the following list of Members of the Society who had accepted the office to serve on the Collodion Committee:—

Mr. Bedford; Dr. Diamond; Professor De la Motte; Mr. Fenton; Mr. Frith; Mr. Hughes, Strand; Mr. Llewellyn; Mr. Mayall; Count de Montizon; Mr. Morgan, Bristol; Mr. Robinson, Leamington; Mr. Rosling; Mr. Thurston Thompson; Mr. White; and Mr. Williams, Regent Street.

Mr. MALONE suggested the addition to the Collodion Committee of Mr. Story Maskelyne, who was one of the first to draw attention to the probable importance of the addition of bromides with iodides; of Mr. Heisch of Middlesex Hospital, who has devoted great attention to matters of the kind; and of Mr. Spiller, who was well known; and there would then be three chemists upon the Committee.

Mr. HARDWICH assented to the addition, stating his belief that it would give satisfaction, and that that satisfaction would be in proportion to the number of names upon the Committee.

The CHAIRMAN stated that, inasmuch as it was for the advantage of the Society and for the art of photography that there should be as much light of science thrown upon the subject as possible, if the three gentlemen named did not object, their names would be added by the Council; and so they would have been without the subject having been brought before the Meeting, if Mr. Malone had been good enough to have communicated with the Council or with Mr. Hardwich upon the subject.

Mr. LE NEVE FOSTER said that the Meeting was proceeding irregularly. The Council were very desirous of falling in with the views of the Society at large; yet still it was the duty of the Council, and not the duty of a meeting of the Society, unless specially convened, to appoint a committee.

Mr. MALONE suggested that, if the names were not added, there would ensue the anomaly of a chemical report from other than chemists, and was proceeding to move accordingly, but was stopped by the Chairman stating it was unnecessary to make a substantive motion, as he was sure the Council would attend to the suggestion.

The CHAIRMAN announced the presence of M. Voigtlander, and hoped that gentleman intended to impart to the Meeting some of the knowledge which had made his name so celebrated throughout Europe.

M. Voigtlander acknowledged the compliment by a bow.

Mr. ROGER FENTON asked to be allowed to show some pictures taken by Mr. Thurston Thompson by means of a Ross's lens constructed upon the principle recommended by M. Petzval, which were all that could be desired, but stated that there was a gentleman present who was better able to speak of them.

The Secretary than read the following letter:—

No. 6 Sussex Gardens, Hyde Park, W.
March 28, 1859.

MY DEAR DR. DIAMOND,—Having received an invitation from M. Voigtlander to be present at a comparison between one of his lenses and one of Professor Petzval's, at M. Claudet's gallery, I think it would be interesting to you to know the opinion I arrived at.

The first trial was with two view lenses of the same diameter (3 inches) by each maker, and the text of the 'Times' newspaper placed at a distance from the lens of 7ft. 4in.—the centre object to focus upon being the illustration of the clock and book of the 'Times' newspaper. To make the trial perfectly fair, I was not told which lens was in; but on viewing the text through each in succession, I had no difficulty in fixing upon that which appeared to me to give the best general definition, the sharpest image, both in the centre of the field and at the extreme edge, besides the power, which is so desirable, of at once putting the lens upon the sharpest focus. It proved to be M. Voigtlander's. Afterwards I found that Professor Petzval's lens required twice the additional distance for obtaining a correct image of the extreme edge, as compared with the centre, as M. Voigtlander's.

The second experiment was two portrait lenses by each maker, of the same diameter, tested as before upon the 'Times' newspaper placed at a distance of 24 inches, each lens in a camera side by side, having the ground glass in each cut from the same piece, to secure perfect uniformity. Here, again, I had no difficulty in determining that which appeared to me to be the sharpest in every way, and it was again M. Voigtlander's. I was also impressed with the fact, that there was a greater amount of light in this gentleman's lens, which I found afterwards has been confirmed by M. Claudet in some experiments he made between the two lenses with his dynactinometer. The diaphragm in Professor's Petzval's lens was $2\frac{3}{4}$, while that in M. Voigtlander's was $\frac{1}{10}$th of an inch wider. Afterwards the second lens of Professor Petzval's was exchanged against the second lens of M. Voigtlander's, and the result was a greatly improved range. In conclusion, I would venture to express the opinion that M. Voigtlander's mounting is preferable to that of Professor Petzval's, the latter running the risk of giving occasion for those points and rings of reflected light so much to be avoided in the mountings of photographic lenses.

EDWARD KATER.

The CHAIRMAN intimated that the letter was read as being the opinion of the writer, and not as the opinion of the Society, and hoped to have the advantage of the observations of M. Voigtlander and others.

The subject of lenses is one upon which great difference of opinion may arise, not simply from the circumstance of what astronomers call the personal equation, the mode of observing, but also the extreme difficulty of making the lenses all perfectly alike, and the fact of not being always perfectly successful; and therefore it would be extremely interesting if any gentleman who has made the subject of lenses his study, will now make remarks that may lead to a discussion upon a subject which really wants elucidation.

Mr. MAYALL stated that some time since Mr. Foubert did him the honour of lending him one of the Petzval lenses made by Dietzler. Mr. Mayall carefully examined it in comparison with another of the same diameter by Voigtlander, and went very carefully through a series of experiments, first, to ascertain that the curves of the two lenses were the same, because he believed it had been stated that M. Voigtlander had deviated from the formula which M. Petzval had first given, and that consequently his lenses were not of the quality exhibited to this Society, and upon which a paper was read by Herr Paul Pretsch. Mr. Mayall found, after very carefully measuring the curves, that there was scarcely any deviation, except that in the last curve there was a difference—the one being 17·50 and the other 18·0; however, in testing them with the 'Times' newspaper and some other tests of a similar kind—and a very excellent one was a lady's dress with a small check—there was no comparison in point of quality: Voigtlander's lens was very much superior; in fact it was so much so, that it had been Mr. Mayall's intention to propose an examination by the Society into the qualities of lenses. Other societies were doing something of the kind; the Photographic Society of Edinburgh had had some experiments; and this Society ought not to be behind. A Committee ought to be established upon precisely the same footing as the Committee to examine Collodion—there ought to be no more mystification—every one ought to know what lenses or series of lenses he ought to adopt, and in future it would incite the opticians to do something superior. The great quality of a lens, and of Voigtlander's lens, is this—they are of very short focus. Mr. Mayall could teach a boy in two months to grind a lens of a long focus that would take a good picture; but the difficulty is to make a lens of a short focus to cover a large field. By short focus one gets an increased area of light; and if you reduce the aperture so that the area of light shall be equivalent to the area of light in a long-focus lens, one would get that which is technically termed fore-depth. He would suggest Mr. Malone as one of the Committee; that gentleman's practical experience had been very considerable. He (Mr. Mayall) did not know whether Mr. Claudet was a member; but there was Mr. Shadbolt and one or two gentlemen, who would form a nucleus. Give each optician notice that he should send to the Committee his very best production of a given diameter, then let the Committee select promiscuously from each maker's lenses another one, so as to be able to test that which each maker professes to be his very best, and that which he ordinarily delivers to the public. By that means we should enable the photographer whose abilities are not of a great calibre, to select his lenses, which were none of them perfect, every one of them having a series of errors; but it is to give the maximum results, which can only be obtained by a number of gentlemen examining and comparing them, and giving a report which this Society will adopt. Six years ago, when this Society was held at the Society of Arts, he made the same observations. Mr. Mayall felt that any gentleman choosing to advertise in this Journal should advertise on the outside sheet and not in the interior. It was high time this scientific journal should put down such a system. For the future the scalping-knife should be used in relation to many of the papers that have been read. As we know that this house, like another House, is about to disperse, and as summer-time is coming we shall be out at different places collecting the beauties of nature, we ought, therefore, to have one or two lenses that we know are the best of the kind. He hoped he had said nothing which might appear invidious to any gentleman, and if he had, he begged to apologize. He simply had a desire for a Committee to inquire which was the best lens, whether that of Ross, Voigtlander, or Shepherd, or anybody else, and therefore moved that a Committee be formed, naming Mr. Malone, Mr. Shadbolt, and any other name that might suggest itself, with power to add to their number.

The CHAIRMAN believed that would be a course quite contrary to the practice of all scientific bodies in London, and he believed of Europe. As a body, except under particular circumstances, they do not engage to pronounce opinions upon matters such as Mr. Mayall had suggested. That it was extremely desirable, and for the advancement of science that such a Committee should be appointed there could be no doubt; but if a mode be adopted with a view to extracting an opinion from the Photographic Society that this or that lens is the best, it would be contrary to the principles which regulate scientific societies. Though there could be no doubt that an opinion from a Committee of gentlemen would be very valuable, yet there was a doubt whether such a question, and the formation of such a Committee, ought not to be delegated to the Society; and Mr. Fenton would be good enough to favour the Meeting with his opinion upon the subject.

Mr. MAYALL said that he could obviate all that difficulty by simply withdrawing the names and proposing a Commitee.

Mr. ROGER FENTON felt that he had been enjoying the *otium* of a private station during the evening, and had been relieved from the cares of office; he thought, with the Chairman, that all committees should emanate from the Council; he had no doubt that any suggestion of Mr. Mayall's would be attended to by the Council; the subject was one of the greatest importance; he had been engaged in the investigation of the properties of different lenses, working with them whenever the weather permitted, and other gen-

tlemen had been doing the same, and he was sure that he did not feel himself in a position to pronounce an opinion; and he thought it would be much more difficult for a Committee to come together and come to a definite conclusion. The only way that any satisfactory conclusion could be arrived at would be by a certain number of lenses being supplied to each gentleman of the Committee to work with for a season, taking pictures with them under all circumstances, taking careful notes of their workings, and giving their result in the form of a report to the Society, and then leave the Society to form their own conclusions. He did not think that taking a lens and looking at the image on the ground-glass and comparing it with another would give a proper opinion, although one certainly might see that the lines were straight and the light good.

The CHAIRMAN stated that it would perhaps be satisfactory to Mr. Mayall to know that the Council had that evening been engaged in a discussion of this very subject, and the difficulty which struck the minds of them all was, that although you might get a very excellent lens from a well-established maker, and which would prove very superior, yet you could not be certain that if you wanted a similar one you could obtain it.

A Member was about to second Mr. Mayall's motion, when

Mr. LE NEVE FOSTER rose to order.—The question was one of business of the Society, which could only be discussed by the Council, or by Members at a Special General Meeting convened for the purpose. The Ordinary General Meetings were for the purpose of reading papers. With all due deference (although he might be wrong), he suggested that Mr. Mayall should withdraw his motion, or rather that the Chairman should not accept it.

Mr. HARDWICH protested against the appointment of a Committee to be worked in the way Mr. Mayall suggested. If the Committee were appointed, they ought to examine the lenses simply with reference to the mode in which those lenses were made. When a Member offers a formula to a Society, then the Society is at liberty to state what they find it to accomplish. If they notice any defect in a lens, they would say as much, and such means of remedying it as might suggest themselves; but to say they found a lens by one particular maker better than that by another, would be decidedly invidious. And how do we know that the optician is able to produce these lenses uniformly? Would twenty lenses from the same maker be all the same? Angry feelings would be generated in the Society, which would do more harm than good.

Mr. MALONE agreed with much that Mr. Hardwich had said, yet nevertheless joined issue with him and the gentleman on the other side upon the whole subject. For a long time he (Mr. Malone) had advocated the formation of this Committee, and had been told by gentlemen who were interested in the management of the Society, that they could not, as a body, give an opinion, or enter into an examination of questions of this kind; and yet, in the face of that, at the last Meeting a proposition was made, in a very ambiguous manner, for the formation of a Committee for the investigation of collodion. He was not present; but his impression was that the Committee were to have an opportunity of comparing a presupposed better collodion with others, the condition being that all makers should communicate their method of manufacture.

The CHAIRMAN requested Mr. Malone to confine the discussion to the question of the formation of a Committee for the investigation of lenses; and stated an opinion, that if it were a question whether the power of appointment was vested in the Council or in that of the present Meeting, that question could not be discussed without express notice.

Mr. MALONE still thought that if the Society allowed the formation of a Committee for the examination of collodion, it should, upon the same principle, allow the same with respect to lenses.

Mr. MAYALL would modify the thing by withdrawing the motion, and simply making it a recommendation or suggestion to the Council. He cared not from whom the Committee emanated, provided he got it; but it was advisable to be in order, if they could.

The CHAIRMAN stated the Council would not lose sight of it. He then appealed to the Meeting for opinions upon the interesting subject of lenses, and appealed personally to M. Voigtlander; but no discussion ensued; upon which

Mr. HARDWICH stated that, finding that Member of the Society who had promised to read a paper at that Meeting was prevented by illness, he had hastily thrown together the following remarks upon some dry-collodion experiments which he had made in conjunction with Major Russell. The observations were made while working in the laboratory of King's College and other places, upon the question of the manipulation of dry and wet collodion together.

Mr. HARDWICH then read the following paper:—

"*On the Use of Sensitive Collodion for the Dry Process.*"

GENTLEMEN,—In consequence of the indisposition of a member who had promised us a paper this evening, I have agreed to make a few observations on the subject of the dry-collodion processes. Experiments have lately been carried on in the laboratory at King's College, by myself and a few friends, to determine how far it is possible to employ the same collodion both for the wet and dry process. In this investigation we have been encouraged to persevere from a feeling that the preparation of a collodion in what is termed a powdery condition is essentially an unsatisfactory proceeding, and that uniformity of composition cannot be expected so long as a decomposed, and consequently unstable pyroxyline is employed.

The first difficulty which occurs in the attempt to work the dry-collodion processes with a newly-made and contractile collodion, is

in the development of the image, the reduction being often feeble, and the negative wanting in contrast. We have not been able to overcome this defect, either in the gelatine dry process of Dr. Norris, or in the metagelatine process of Maxwell Lyte; but by the employment of albumen after Fothergill's method, we have succeeded in doing so. With the collodion which we now employ, the image appears to be principally upon the surface of the film; and the amount of penetration by the developer is evidently small, seeing that the reduced silver can frequently be wiped away with cotton-wool without disturbing the collodion beneath.

The question of intensity being thus disposed of, we proceed to the consideration of another difficulty, viz. blistering and stripping away of film. Suggestions on this head have lately been made by various gentlemen, who recommend gelatine, albumen, &c. as a substratum for the collodion. Mr. Barnes, however, may claim the priority as regards publication, having discussed the whole question in the second edition of his 'Dry Collodion Process,' issued in 1857.

The objection against applying gelatine or albumen to the surface of glasses which are to sustain collodion films, appears to me to be, that if any portion of the glasses so coated should be soiled at the back by the gelatine, or should be afterwards imperfectly covered by the collodion, the nitrate bath might gradually receive injury from solution of the animal matter. But, independently of this, I have not found gelatine to be a sufficient protection in all cases, the collodion film occasionally stripping away at the lower part of the glass, where the layer of gelatine was somewhat thicker than above.

India-rubber dissolved in benzole is, I think, better than either of the substances last named; and, practically, there appears to be but little fear of a collodion film slipping away after the application of such a varnish. Its action on nitrate of silver is scarcely perceptible; and it has also the advantage of being quickly prepared, and of keeping for any length of time. It pours easily upon the glass, and dries very speedily. Even when the collodion proves to be of the non-contractile kind, the preliminary application of the benzole varnish is not altogether useless; for, as a practical observer has remarked, it saves some trouble in polishing glasses, and enables you to take a clean picture upon a dirty plate.

There is, however, one difficulty which occasionally presents itself in the use of this varnish, viz. a very regular cracking of the collodion film, evidently from the caoutchouc beneath not admitting of the proper contraction on drying. This cracking in fine lines does not invariably occur, but the employment of artificial heat appears to favour it. A friend of mine who has adopted Mr. Sutton's suggestions, and prepares his collodion with two or three parts of alcohol of specific gravity ·805 to one part of ether, tells me that he has never seen the cracks.

The above remarks will suffice as an outline of the process; the details I shall be happy to supply either at this or at any future time. Let me conclude by pointing out what I conceive to be the advantages of this new mode of proceeding; and first I may say, that it will yield a superior quality of negative in one-half of the time usually allowed for a dry plate. Major Russell, who is a member of our Society, and has had great experience in these matters, has given me permission to exhibit some pictures which he has lately taken with a newly-iodized and sensitive collodion of his own manufacture; and he is of opinion that if he had employed a powdery collodion, such as is usually sold for the metagelatine or the Fothergill process, he must have allowed double the time in the camera. I myself have been practising upon a view which, for the last three years, I have considered to require five or six minutes of exposure, and I now find that three minutes gives me a good picture. To what cause, therefore, is the additional sensitiveness attributable? Not, as I conceive, to the absence of free iodine in the collodion, nor to the presence of bromide in conjunction with the iodide, although both of these conditions are favourable, but rather to the pure and undecomposed state of the pyroxyline, and to the molecular structure of the film. On purposely preparing collodions of feeble setting power, and of the pulverulent rather than of the horny kind, much of the sensitiveness at once disappears, although the action of the developer is more rapid.

The film produced by the hard and contractile collodion dries into an impenetrable coating like gold-beater's skin. The iodide of silver is more in the substance of the collodion than upon the surface, and the finger rubbed backwards and forwards does not at once remove it. The negatives taken on such a film are beautifully defined, and resemble wet-collodion pictures as regards softness. With a pyroxyline of the pulverulent kind, they would be black and white after a short exposure, and an extra exposure in the camera would be only a partial remedy.

The development of the image is, as before said, the only part of the process which offers any difficulty. It is not so rapid as could be

desired, and requires care. When we remember that in the absence of sensible penetration by the reducing agent, the image has, so to speak, to be built up particle by particle, we are prepared to allow a proper time for the operation. I myself have invariably employed gallic acid, and am content if the image is fully out in one hour; but the specimens I exhibit were developed quickly at first with sulphate of iron, and subsequently intensified by pyrogallic acid.

I must not be understood to say that any sample of wet collodion will succeed for the dry process if treated as I now describe. All our experiments have been made with one particular kind of pyroxyline, prepared from cotton-wool at a temperature of 140° to 150°, in acids containing, by measure, three parts of oil of vitriol of 1·84, one part of nitric acid of 1·45, and three-quarters of a part of water. Collodion made from such pyroxyline soon sets upon the glass, almost independently of the amount of alcohol present, and is very little prone either to blistering or stripping up. When used in the wet process, it produces considerable intensity even immediately after iodizing, does not lose its sensitiveness for many weeks, and resists a tolerably strong light without solarizing. The two properties last mentioned prove beyond a doubt that the pyroxyline is of the stable kind, and has not suffered much decomposition or conversion into nitro-sugar compounds in the acids. Any one with a little experience can prepare this kind of pyroxyline uniformly.

Supplementary note to the above paper.—The following details may be given as to the mode of preparing the varnish, &c. Dissolve about three grains of pure caoutchouc, sheet or rubber, in an ounce of benzole, by digesting it in the solvent for twenty-four hours, with or without the aid of heat. If of the proper consistence, it will filter slowly through blotting-paper, and will flow upon the glass exactly in the same manner as collodion. After coating the glasses, rear them up to dry spontaneously, and afterwards hold them near the fire to drive off the last traces of benzole. This precaution is necessary to prevent the ether from exercising a solvent action, and leaving a mark at the spot where the collodion is poured on.

Iodize the collodion with the positive iodizing solution, containing one grain of bromide and three and a half of iodide of ammonium in two drachms of strong alcohol.

The mode of washing the plates may be that suggested in a late Number of this Journal, viz. to use about three ounces of distilled water for a glass of stereoscopic size, and to wash away the free nitrate and the albumen in the same portion. In order to increase the keeping properties of the plates, add a minim of glacial acetic acid to each ounce of the washing water, and always finish with a bath of rain or distilled water applied rather plentifully. If the plates are removed from the three-ounce washing-bath and dried without further precaution, a trace of nitrate of silver is left, and the film becomes brown and gives foggy pictures in the course of two or three days. These particulars will suffice for the guidance of such as may desire to experiment further in this very promising process.

Some specimens were handed to the Meeting.

Mr. Mayall had seen the specimens, and was still of the opinion that he could produce a better picture with albumen alone, than with a mixture of albumen and collodion. Mr. Hardwich's spreading a thin coat of india-rubber upon the glass, got rid of many imperfections in the glass, but he (Mr. M.) was afraid it would introduce many others; he preferred confining himself to as few surfaces as possible, and more particularly in dry processes; he believed also upon that subject there ought to be a committee. As the wet process was becoming so valuable, and as the keeping qualities of a wet-collodion plate could be suspended for three-quarters of an hour, we had not the same difficulties now to contend with as formerly; it was the suggestion of Mr. Maxwell Lyte, of very small quantities of nitrate of magnesia in the bath. As Mr. Shadbolt was present, Mr. Mayall stated that he knew a gentleman in Perth who had been working the honey-process with a success he (Mr. M.) had not seen equalled, and he thought he could bring that gentleman to the next meeting of the Society. Mr. Mayall would be happy to join any two or three gentlemen to compare the merits of albumen alone. He would teach any six gentlemen, and devote an hour a day until they were perfect in the albumen process alone, in which case, by the end of the season a series of notes could be made which would be very valuable. He had a horror of mixing things. Two films he thought enough; but Mr. Hardwich now proposed a third. He (Mr. M.) could say very little upon the paper which had been read, for he thought the experiments were comparatively new and incomplete; but if Mr. Hardwich would supply him with some of the material, he would endeavour to experiment upon it, and discuss it at the next meeting.

Mr. Malone stated he had Mr. Mayall's horror of mixtures; but inasmuch as albumen alone was not so sensitive as albumen on collodion, the mixture must be adopted. There is a peculiar crispness with albumen alone; and the admirable result of albumen alone is retained in albumen upon collodion.

Mr. Mayall forgot to add his belief that Mr. Malone, and all the operators upon albumen alone, lost sight of the great principle he stated in a paper, of exciting albumen with dry iodine by passing

it over the dry iodine box for two minutes before it went into the silver-bath, which made it quite as sensitive as collodio-albumen. He thought there was more to be done with gaseous iodine on film of albumen and gaseous bromine than has hitherto been done; he believed that Mr. Malone himself, in the 'Athenæum' some years since, suggested a small portion of bromine to increase the sensitiveness of albumen.

Mr. Malone was much obliged to Mr. Mayall, but still thought the combination of collodion and albumen preferable. Mr. Hardwich had, after his usual manner, stated everything as regarded his mode of operating. The thing appeared quite clear; still he thought it likely that on trying this plan of making pyroxyline he should not succeed, and therefore he would ask whether, upon failure in producing the desired result, he might take the specific gravity of the acid as sufficient. He had an impression that Mr. Hardwich had modified his opinion, and now found that science was of no avail, and that one must use the rule of thumb, and add water until the desired result was obtained. He wished also to ask whether the kind of cotton used matters, and if so, what kind of cotton should be used with that formula.

Mr. Hardwich stated he thought that the specific gravity of the acid was not of itself sufficient; but it was the only guide he could give; and that would sometimes deceive, because the acid might contain sulphate of potash or sulphate of lead, which would throw you out in your calculations. Make your mixture from the specific gravity, and if you find it too weak, then increase the oil of vitriol. With regard to the kind of cotton, he was not quite certain; he had twenty different kinds from all parts of the world; but in the mean time he used the best he could get, combed free from the dust or straw; he must say, if one failed the first time, try again.

Mr. Sebastian Davis prepared some silver plates during the last twelve months, went into the country and exposed them; as far as the dry process went, he could not alter them, except as to time of exposure, and he found that, to bring out the details of shadow and the foliage properly, he wanted from ten to twelve minutes.

Mr. F. G. Elliott.—Some time ago, having used the dry process, and used common cake india-rubber dissolved in coal-tar naphtha, it kept the film from moving, but it afterwards cracked in all directions.

PHOTOGRAPHIC SOCIETY OF IRELAND.

This Society met in the School of Arts of the Royal Dublin Society, Kildare Street, Dublin, on Friday evening the 25th of March. In the absence of the President, John Bayly, Esq., in consequence of illness, the Chair was taken by Thomas Grubb, Esq.

Communications were read from the Photographic Societies of France and Glasgow, announcing their exhibitions, and the replies of the Honorary Secretary thereto.

The Report of the judges of prize photographs, appointed at the last Meeting of the Society, was then read. The prize medal for glass negatives of landscape was by it awarded to Arthur Barlow, jun., Esq.; that for paper negatives to the Countess of Ross, and for stereoscopic negatives to Thomas Brownrigg, Esq.; that for "the best negative with reference to artistic choice of subject," to Arthur Barlow, jun., Esq.; and it was resolved "that the Report be confirmed, and that it be referred to the Council to make such arrangements as they think proper for carrying out the same, and for having copies of such of the prize negatives as they think proper, printed for distribution among the members of the Society."

The following gentlemen being proposed and seconded, were admitted members of the Society:—George Orr Wilson, Esq., Thorn Hill, Belfast, and R. Reeves, Esq., Upper Mount Street, Dublin. The Chairman having then vacated the chair, R. J. T. Macrony, Esq., was called thereto to act as Chairman of the Section of Fine Arts and Photography.

H. McManus, Esq., R.H.A., read a paper "On Art Education;" and Thomas Grubb, Esq., read the following paper "On the effects produced by enlarging the aperture of the Photographic lens":—

Before entering upon the subject of the present communication, it may not be amiss to remove any misapprehension which may have arisen from the title given. I am not going to enter at present upon the question which has given rise, in other localities, to rather angry discussion, viz. that of the fitness (or unfitness) of portrait-lenses of larger apertures for the work for which they are intended, although this branch of the subject is one which the Section of Fine Arts, in conjunction with the Photographic Society, seems highly fitted to discuss. Neither do I purpose to revert to another branch, which I have already treated in a paper published in the London 'Photographic Journal,' viz. the *inevitable* definiteness of focus of a lens, corresponding to its aperture and focal length. The present paper is intended to be confined to the consideration of those effects in the photographic picture depending upon varying the aperture of the lens, this aperture being (comparatively speaking) small, or, in other words, ranging between the largest and smallest aperture used with a "view" lens.

Photographers in general recognize two effects (only) as produced by varying the aperture of the lens, viz. increased distinctness, combined with slower action, by a lessening of the aperture, or these same inverted by increasing it. Thus we not unfrequently hear it asserted that when "still life" only is to be copied, it is of little consequence how small the aperture used

is, as by giving increased time of exposure to the sensitive surface in the camera, the resulting picture will be similar in all points to one obtained by using a larger aperture of the lens, and giving a shorter exposure to the sensitive surface.

It is this commonly received opinion which, as I deem it to be erroneous, I desire here to combat. I apprehend that, as photographers become convinced that *there is* an effect due to aperture, their pictures will become more artistic—that we shall have pictures which have been taken in sunlight, *to represent such*, rather than moonlight ones—that we shall have photographs giving more of breadth and solidity in the foregrounds, and air and perspective in the distances—in short, that we shall have more of a picture and less of the present peculiarity of the photograph.

A photographer prides himself on the truthfulness of his work in its details. This is very well in itself; but it should cause him to recollect that such as is the image given by his camera, such should be expected in the general effect of the photograph derived from that image. Now, let him place his camera, on a fine bright day, before, say, a landscape, and if possible, *within a room*, or at least so that, instead of examining the visual picture bit by bit with the discomforting aid of a focusing cloth, and perhaps with the addition of a magnifying glass, he shall be sufficiently removed from the light to take a general view of the visual picture as received upon the greyed surface; and let him also provide an assistant to change the stops, without requiring himself to leave his post at the camera. Matters being so arranged, let him observe the visual picture or images as produced by various apertures, which latter should range in diameter from at least $\frac{1}{15}$th of the focus of the lens for the largest —*e. g.* 1 inch diameter for 15 inches focus of lens —down to the least he desires, even to that lately proposed to be used with an improved (?) lens, viz. $\frac{1}{8}$th of an inch diameter for a focus of 8 inches, or say $\frac{1}{64}$th part of the focus; and, the results being noted, I think there will be but one opinion, viz. that each step in the reduction of the aperture of the lens is accompanied, not only by a reduction of the brilliancy of the images, but by a distinctive difference in the character of the same—there being an evident loss in the vigour, the solidity, and the distances of the several parts making the picture.

Now, laying aside the camera, let a similar course of experiment be performed with the *eye*, for which nothing more is required to be provided than a series of holes, well blackened, in a thin plate, varying from, say, $\frac{1}{8}$ to $\frac{1}{64}$ of an inch in diameter. Precisely similar effects, perhaps more striking, will be observed by viewing the sunlit landscape with one eye, and using the varied apertures, as in the previous experiments with the camera and its varied diaphragms.

If further proof in the same direction be desired, we have this in both the telescope and the microscope. With the former, the moon will afford a striking illustration. In proportion as the aperture of the object-glass is reduced by diaphragms, the image assumes a map-like appearance; while, on the contrary, as the aperture is increased, those mountains of our satellite where light and shade prevail stand out in bold relief.

The microscope gives evidence to the same effect. The best object-glass of such, sufficiently "stopped down" (or reduced) in aperture, gives sharp outlines, it is true; but the effect (or appearance) of solidity is lost.

Lastly, we have the evidence given by photographs themselves; to illustrate which some are exhibited taken with apertures greater than those in ordinary use. I think it will be admitted that these afford evidence of that which I have undertaken to prove. Doubtless, it would have been still more convincing could I have placed before you photographs of the same view, and taken as nearly as possible under similar circumstances, but with diaphragms of varied apertures; but this I have not had either time or opportunity lately to accomplish.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

March 21, 1859.

At an ordinary Meeting of the Society, held this day at Mr. Wheeler's, 10 The Grove,—the President, J. Glaisher, F.R.S., in the Chair, the Minutes of the last Meeting were read and confirmed.

The President presented the Report of the Soirée Committee announcing the kind acquiescence of the Lord Mayor in reference to holding the Soirée at the Mansion House, the 15th of April being fixed as the date of the Meeting, the invited members to assist in making this Soirée "a great success."

It was moved and seconded—That the Committee originally named be reappointed, viz. the President, Treasurer, and Secretaries, and officers Messrs. Bennoch, Heisch, and Wood.

Messrs. Stuart, Knill, and H. Williams were appointed Auditors for the ensuing year.

The President, Mr. Glaisher, then proceeded to read a Paper "On the Application of Photography to investigations in Terrestrial Magnetism and Meteorology as practised at the Royal Observatory, Greenwich."

The author commenced by stating that the subject resolved itself into two divisions, viz. the Purposes to which Photography is Applied; and, secondly, the Method of Application; and he observed that it was necessary to consider somewhat in detail the first part of the question in order that the full value of the application of Photography should be understood, and that he purposed to confine himself on this occasion to the subjects of investigation, reserving the consideration of the Mode of Application for another evening.

The subjects of investigation were those elements in Terrestrial Magnetism and Meteorology which it was considered most important at present to pursue. First, speaking of Magnetism, he said, if a bar of iron be suspended by a few fibres of silk at its centre, it will be horizontal, and will settle in any position; but if the bar be made magnetic it will at once pass to a definite position, and one end will be inclined downwards. This direction of the magnetic force, he said, undergoes every possible change at the different parts of the earth's surface, and, for the purpose of determining and representing the direction, is referred to two planes, the one horizontal, the other vertical.

If a magnet be suspended horizontally by a few fibres of untwisted silk, it will rest in the magnetic meridian, and the angular distance between this position and the true meridian is called the variation or declination. The other plane of reference is a horizontal line, the angular distance between which and the inclined portion of a magnet when suspended freely is called the dip.

In the practice of the Observatory, the variations of the dip are made by investigations in the horizontal and vertical components. The variations of the three elements, viz. the declination, the horizontal force, and the vertical force of the dip, are the subjects of photographic application; and when it is considered that, if the most minute spider should unfortunately gain access to the balls containing the magnets and attach one line of his web to the end of the magnet, all freedom of motion is destroyed, it is evident that it can be by some imponderable agent alone that such minute and delicate movements can be registered; and this service is satisfactorily performed by the means of photography.

The author then briefly referred to some application of such investigation. He said the mode of operation was as follows:—Taking the declination as an instance, when any portion of the globe was sufficiently rich in results, they were laid down in proper positions on a map, and then with a free hand and good judgment isophænomenal lines were drawn. A map thus prepared by J. Evans, Esq., was exhibited, showing the lines of equal declination as far as are now known over the world.

A vote of thanks was then tendered to Mr. Glaisher, and a hope expressed that the subject would be resumed at some future meeting of the Society. W. Nelson Smith, Esq., was elected a member; and the following gentlemen were proposed for future election, viz.—Robert Obbard, David Harding, and Andrew Itter, Esqs. The meeting then adjourned.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith. The same proviso extends to communications to the Editor.

Photography, as adapted for Tourists. Exemplified by a recent visit to the Spanish Coast.

[Read before the Photographic Society of Ireland, Feb. 29th, 1859, by Sir J. J. Coghill., Bart., Vice-President of the Society.]

It may at first sight appear, that to an audience like the present, wholly composed of scientific and practical men, any account of so entirely a pleasure tour as that from which I have just returned would be out of place, and perhaps a waste of valuable time. As, however, the pleasure of that trip was mainly derived from the pursuit of the science whose cultivation is the object of this Society, I may perhaps be allowed to trespass upon your attention for a short time, in the hopes that amongst a good deal of irrelevant matter there may be discovered some particles of practical utility, which may hereafter prove of service to any who may be tempted to substitute the camera for the sketch-book when visiting distant scenes.

November is the month in which most landscape photographers at home reluctantly fold up their cameras for the winter and betake themselves to other pursuits; for photographers cannot be expected to sympathize with the patriotic skipper, who, on entering Northern latitudes, declared one rainy day that "he thank'd his stars that he had at last got into a reasonable climate, and wasn't going to see

no more of your blessed Hitalian skies for one while at all events." As for our party they were photographers as well as sailors, and so determined to put up with this inconvenience and follow actinism and genial weather to the sunny waters of the South.

It has been my good fortune on past occasions to have addressed this Society upon my return from foreign photographic rambles; and I have from time to time exhibited views from many parts of Europe. Perhaps, now that I have added to my stock of negatives some taken in that country so rich in interests both historical and pictorial—" Old Spain," I may be allowed the license of a traveller to advance my views upon the practice of field photography, as founded upon experience.

The first point that strikes anybody who has photographed in different parts of the world, is the dissimilarity of photographic circumstances, if I may so speak, which exists between each different journey, rendering dissimilarity of treatment necessary. In some places, the views most worthy of note consist principally of buildings or street scenes. In others, the interior of cathedrals and other public buildings tempt the photographer. Again, in Norway Switzerland, the Tyrol, and many parts of Italy, nature, unhampered by human art, forms the attraction; still, for each of these some modification in practice is necessary, which must be thought over and prepared for before the start is made, or there will be disappointment. Then, in addition to the difference between the subjects chosen, comes the question of actinic differences; for, beyond controversy, the photographic energies of the light in different countries vary so considerably that one universal system is impossible. In short, the home practitioner who has his photographic snuggery under his lee, who goes forth in the morning with his well-ordered paraphernalia, and, if he happens to be a wax-paper man or a dry-collodionist, returns in the evening to develope his negatives at his ease in his own *sanctum sanctorum*, would err greatly did he argue from results so obtained, that a like success would attend a similar practice away from home and its resources.

The next point to be considered is the choice of a process; and here I am aware that I am treading upon delicate ground. Photographers, as a body, are a most cordial fraternity, and in general I think there has been an expansive and generous desire among the body to keep back nothing from the brotherhood which might tend to the general good. Touch a photographer's pet process, however, and you have him at once in arms! A righteous jealousy seizes him, and he is ready for an internecine strife; his war-cry a paraphrase of that of the Moslem—There is but one photography, and my process is its exponent!

Upon no subject have the debates of this Society assumed a more lively character than when the respective merits of the rival processes have been under discussion, and I myself have, I am afraid, more than once thrown the apple of discord, when upholding the merits of my favourite wet-collodion against all comers; indeed upon some occasions so animated has been the discussion, that it has become evident that some photographers' feelings are more *sensitive* than their processes.

I think, under these circumstances, you will agree with me, that now, when the subject of my paper demands that I should once more walk over this mined ground, I had better tread carefully. The fact is, that when speaking upon the choice of a process, I should rather have it understood that my remarks have reference less to those who have attained to some degree of perfection in any of the various processes, than to those who are still free o choose. Fix upon a process, and stick to it, is the best advice I can give. All have their own peculiar excellences. There can be no doubt that the man who wanders from process to process is a " rolling stone that gathers no moss," and is unlikely to excel in any. Still, beginners must make a selection, and nothing gives them a better opportunity of deciding than by hearing the merits and demerits of each process argued out by old hands, specimens of whose handiwork are constantly before them to give force to the arguments. I will therefore give one or two of my principal reasons why I have adopted the wet-collodion process, and why I consider it peculiarly well adapted for the *amateur* photographic traveller.

In the first place, I think I may say without fear of contradiction, that of all phases of photography the one best adapted for giving a living reality to scenery, and recalling the most minute circumstances connected with a visit to places worthy of remembrance, is the stereograph.

The stereoscope is now an institution of every home—a veritable " household word;" and although its uses have been abominably prostituted, and its services enlisted in the cause of pruriency and bad taste to an extent which has led to the undervaluing of its legitimate merits, it is still, when in the hands of the refined and educated, one of the greatest boons that science has yet contributed to art. Besides this, it is peculiarly adapted to the requirements of a travelling photographer, as the apparatus is more portable, and the manipula-

tion easier than for photographs of a larger and more ambitious nature. It is, in fact, the photographer's sketch-book, and this being exactly my want I accepted it as a starting-point, and determined to make my other arrangements tally therewith, if possible.

This at once put the paper processes out of the field of competition, for they can rarely produce proofs of sufficient sharpness of detail to pass through the magnifying ordeal of the stereoscopic lenses, and require an exposure so lengthened as to render the introduction of living figures into the picture next to impossible. There remained, therefore, for me a choice between wet and dry collodion, the latter of which I rejected for several reasons, the principal one being the necessity of subsequent development.

In the wax-paper process the evil attending this necessity is, to a certain extent, atoned for by the increased length of exposure—for it is evidently an easier matter to judge the proper time when minutes are concerned, than where we have to do with seconds; but the dry-collodion processes do not possess this excuse, and without taking into account the very possible presence of spots, flaws, marblings, and such like, which cannot be detected until after development, it is quite possible for a dry-collodionist to return from a day's work and find nothing but failures, merely from ill-judged exposure. To a person residing on the spot, this would be of comparatively slight importance; but with the travelling photographer, who is here to-day and gone to-morrow, it is, to say the least of it, throwing away a chance.

Subsequent development, also, would deprive me of one of the principal enjoyments I derive from field photography — that of finishing my picture on the spot. Who that has ever experienced the delightful sensation of bringing forth from the dark box a finished negative, of examining it in every little detail as it dries in the sun, and finally depositing it in the plate-box with a satisfied snap of the lid, will not acknowledge the pleasure of so doing, and corroborate me when I say that the completeness of satisfaction so obtained has robbed many a long mile of its sting? and then, lastly, consider the inconvenience and difficulty of turning your hotel chamber, or, as in our case, a yacht cabin, into a photographic laboratory! Is not this a serious consideration? I confess, that though tolerably earnest in my pursuit of photography, I look upon the after-dinner-hour as one sacred to repose and relaxation, especially when it follows a day of tolerably hard work, and would feel considerable reluctance to open the campaign *de novo*. I am all for the early-closing movement in photography.

There are, however, some cases where it would be advisable for the travelling photographer to avail himself of a good dry process, and, therefore, I should recommend any one proceeding on a lengthened tour, to provide himself with a few dozen prepared plates, especially if he feels at all nervous about working before large audiences in crowded towns, or desires to take the interior of public buildings, or cathedrals, where the "dim religious light" requires a prolonged exposure. In such cases I have no doubt that dry collodion will prove a valuable accessory.

Having decided upon the process, the next matter demanding the travelling photographer's attention is his kit, and a very important point it is. The best carpenter cannot work with bad tools. I have, however, some difficulty in recommending any particular form of apparatus, inasmuch as those best adapted for every possible contingency are generally the result of a necessity which has dictated the altering of a bit here and a bit there, from time to time, so as to suit the fancy of the individual. Such an apparatus, though it might be admirable in the hands of the original inventor, would be sure to prove complicated to a beginner.

There are, however, some general rules which it may be as well to lay down as guides to selection, and in the very first place I shall name simplicity.

Anything particularly "dodgy" should be regarded with suspicion. *Factotums* and *multum-in-parvos* are very enticing, but are generally complicated in detail and liable to get out of order and break down. It is well to have as little as possible with you that a common carpenter cannot repair in case of accident.

Strength and sufficiency of size come next, and within certain bounds these are even of greater importance than portability. The desire to lighten the load has often been productive of rickety, inefficient apparatus; and though a handy operator may, by dint of practice, become very expert in working in a confined space, it is better to have good elbow-room, which spares much disappointment, and is the best security for clean work.

Again, we must have an eye to weather-worthiness. The photographer should be beyond the annoyance of an occasional shower, or the vicissitudes of climate. He should have no wood-work but from the oldest and best-seasoned timber. A warp is often fatal; and, as an additional precaution against it, I have found great advantage from glueing slight canvas over the outside of the cases, and covering it with a couple of coats of paint.

Lastly comes portability; and on this head

all my experience tends to the conclusion that, with a due regard to comfort and strength, you cannot reduce the weight of what has to be carried for the day's work very far below thirty pounds, which divided between two men forms as much as can reasonably be expected from ordinary porters. In Switzerland, however, you may, if you please, considerably increase this weight without extracting a complaint or remonstrance; indeed most Swiss guides would carry the whole and think very little about it. In fact, the nature of the country being so mountainous as to preclude much horse-labour, the Swiss are trained in as beasts of burden from the moment they can toddle, and the result is (to speak *Hibernicè*), that the back of a brave Swiss boy actually feels *lonesome* without a load. Should, however, this weight seem excessive, it must be remembered that, except in Switzerland and other mountainous countries, there is rarely any necessity for proceeding to any such extremities as burdening yourself or guides for any distance exceeding a mile or two; conveyances are plentiful everywhere, and any divergence from roads such as mules or donkeys can travel on, rarely is over that distance.

During my late tour, our sailors were specially engaged with the condition that they were to carry the photographic traps when required; and I must say that "Jack" seemed inclined to look upon his burden rather in the light of a lark than of an infliction; and if ever the day was more than ordinarily hot, or the way toilsome, an extra glass of grog was always a good equivalent.

I divide my travelling kit into four parts, viz.: 1. dark chamber; 2. stock-box, which also holds the camera and chassis; 3. camera-legs; and, 4. a store-chest, which forms part of the heavy baggage. Of the two first-named I contrive that one of them shall be something lighter than the other, for the sake of fair play to the man who has to carry the legs, and also as a slight act of "partiality, favour, and affection" to my own back, in case I may have now and then to act as porter myself.

Eschew all tents; they are inconvenient, heavy, and troublesome in every way. There are numberless dark operating-boxes now before the public far lighter, easier worked, and better adapted for the wet-collodionist. Again, never be seduced into getting an affair that purports to be camera and tent all in one. I will point out some of its inconveniences. Often and often you will come upon scenes where the best point of view barely affords standing space for the camera-legs, or upon others where the tripod has to be so extended as to make your back ache as you stoop over it; or again, where you have to work on the rough side of a hill, with one knee close to your chin, and the other leg trying to find itself a resting-place for the tip of its toe, and almost always beneath a fervid Southern sun which beats down savagely upon your head, as though it would melt your very brain. No; the real luxury of field-photography is to have your dark chamber set up comfortably under some sheltering tree, or under the shadow of some protecting rock, at the exact height most convenient to you, with a good foothold on the flat turf, safe from wind, dust, and *coups de soleil*.

Allow yourself means of admitting plenty of yellow light into your dark chamber from within. Many people have a nervous horror of any light, even when it is yellow; but, within a very ample margin, I have never stinted myself in the article, nor received any injury therefrom: on the contrary, it will be found that if from wear and tear any small quantity of light should come to leak into the operating-box, a good, wholesome flood of yellow light will have the effect of neutralizing its evil influences, and for this cause I have the inside of it painted a bright orange in preference to black. Theoretically this may be all wrong, practically I guarantee its accuracy.

Lastly, have your box so constructed as to carry stores of everything required but glass for six or eight days, and thus render yourself independent for that time of the store-chest, which can be left behind, or sent forward to meet you at your next station. As for the glass, a good stock can be easily carried in your portmanteau, and a grooved box for a dozen in the stock-box will be as many as you are likely to require for a day's work.

In conclusion, I must mention two more items which are *sine quâ non* in the kit: to wit, a certain amount of assurance, and any quantity of good temper. The public eye is not as yet sufficiently familiarized with the sight of street photographers, and the erection of a camera soon obtains for you a *cortége* as numerous and respectable as if you were the proud proprietor of a Punch-and-Judy establishment. *Gamins* and *Farceurs* are to be met with everywhere—gentlemen who seem to have no earthly business except to interrupt yours and gratify their curiosity; and it must be confessed that it is a little trying to both nerves and temper to find yourself the cynosure of the many-headed, and the butt for its witticisms. To anybody who lives in dread of "the eyes of Europe," it is certainly a painful position; but it is a weakness that can and must be conquered, and the photographer can

always console himself with the philosophy of the gentleman who was never at a loss for an excuse for eccentricity. When he did anything very out-of-the-way at home, he was wont to say, "What's the odds? everybody knows me;" and his excuse abroad was equally valid, "What can it matter? nobody knows me."

After all, I believe "King Mob," if properly treated, is a very easy-going monarch, and though quickly irritated, equally ready to be conciliated. Treat him disrespectfully and show temper, up goes his back, and a dogged I've-as-much-right-to-be-here-as-you mood comes upon him; he will then stand deliberately in your light, meddle with your apparatus, and bestow upon you an unlimited supply of the article known by the name of *chaff*. On the other hand, take him pleasantly and good-humouredly, and in a few minutes he becomes your slave. Should some of the members of his body press inconveniently upon you, straightway he swears himself in as your special constable, keeps the space clear, is savage to offenders, fetches you water, stands for foreground, and, in short, does his best to make himself agreeable. A little tact on your part will bring this pleasant state of things about; and once gain the sympathies of the crowd, and you will find it a more efficient body-guard than the whole C Division of the Metropolitan Police.

Nothing now remains for me but to thank you for the attention you have bestowed upon me, and to bring before your notice a selection from the views taken by me on my way.

The first view taken was in the Scilly Islands, which we were compelled to run for under stress of weather: two of the stereographs represent the harbour and town of Hugh Town, the principal place in the island; the third shows a strange mass of huge granite boulders fantastically grouped, and called from its appearance the Pulpit Rock. From this point you look down upon the scene of a terrible disaster; for it was upon the jagged rocks that lie beneath it, over which the sea breaks perpetually, that Sir Cloudesley Shovel, the English admiral, and the whole fleet under his command, were lost, exactly 153 years before the very day on which we were photographing it, the catastrophe having taken place on the 22nd of November, 1705.

The next view is of Netley Abbey, situated upon the banks of Southampton Water. I obtained this negative while the ship was fitting out at Lymington.

Coruña was the first port we touched at after leaving the shores of England. I got two pictures there: one representing the monument erected over the hero, Sir John Moore; the other a street view, which abruptly ended my photographing in Coruña. I had obtained a negative of a street which had some flaws about it, and had prepared a plate for a second attempt, when the crowd opened, and a semi-military-looking gentleman, whose ugly uniform proclaimed him at once to be a policeman, came forward and interdicted our further proceedings. It is sometimes a useful thing to be a little deaf, blind, or stupid, and just at this moment both myself and Captain Henry were seized with a distressing want of comprehension, and it took so long to explain that, the town being fortified, all photography was interdicted, that the present negative was finished before we were obliged to "move on."

From Coruña we went inland to St. Jago di Compostella, the great shrine of all the Spanish pilgrims. I regret to say that it rained incessantly the whole time we were there, so that but few pictures could be got. I would wish to call your attention to a peculiarity about one of them. In the foreground slept tranquilly three fat ducks; their repose seemed so assured, that, in spite of the rain and long exposure, I thought I would risk leaving them undisturbed; scarcely, however, had the lenses been uncovered when one of them awoke, stretched himself, quacked, awoke the others, and then all three proceeded to wander about in search of food. You will see that this conduct has multiplied my three ducks into a very respectable brood.

From Coruña we sailed to Vigo, but found that the scenery, though really magnificent, was on too extended a scale for our purpose. I got one good negative during the half-hour we were ashore, but it so inadequately represented the beauty of the place that I destroyed it.

Lisbon, our next halting-place, has not much about it worthy of the camera. About fifteen miles off, however, is Cintra, the Brighton of Portugal. The Piña, or summer palace of the King's father here, is well worthy of a visit. There is a little of the gingerbread cockney style about it, and there are a lot of lath-and-plaster fortifications which could well be dispensed with, but it is nevertheless a grand building, as these stereographs will prove, and quite unique in its way.

Of Cadiz I have only one view, and I much regret it, as also that we could not find time to visit Xeres de la Frontera, which, besides being the great sherry depôt of Spain, possesses one of the most magnificent cathedrals in the kingdom.

From Cadiz we ascended the Guadalquiver in a steamboat, and sad and thankless a task as

it is to destroy pleasing delusions, it becomes my duty to do so in regard to this river. I will venture to say, that eight out of ten men who are asked their impressions of the Guadalquiver will tell you that their fancy paints it a bright and sparkling sheet of water flowing through lovely scenery, washing the base of rugged mountains whose tops are crowned with ruined castles of the age of the Moors and the Cid Rodrigo Diaz, or winding through cork forests and orange groves,—"a thing of beauty," and therefore "a joy for ever!" Now listen to the sad reality. If you were to run a broad canal through the very centre of the Bog of Allen, you would obtain a prospect as varied and cheerful as the course of this first of Spanish rivers. As far as the eye can stretch on either side, before you and behind you, extends a plain as level as a billiard-table, unbroken by tree or hill. Every now and then a herd of cattle, from which are selected the bulls for the arena, relieves the dreariness, and comes down to sniff, but not to drink, the brackish tidal water as it goes down to purge itself in the sea of the turbid mud that defiles the whole length of its course to the colour of pea-soup. This is the unvarying prospect until within a few leagues of Seville, where the orange-trees begin to grow along the banks, and destroy, in some degree, the monotony of the journey.

Of Seville I have several pictures, mostly views of the Cathedral, the Giralda, and the fine Moorish Palace of the Alcāzar, lately restored. As to Seville as a town, the Spaniards have a proverb about it which, notwithstanding national pride, is hardly an exaggeration:—

"Que no ha vista Sevilla,
No ha vista maravilla."

I will not, however, detain you with any description of it; its interests are too varied and foreign to this paper to allow me to do so. I must pass on to Gibraltar, where my cruise ended, and where I completed my series of stereographs under the sanction of a permit from the Governor.

It is a truly wonderful rock, and one that would find a photographer occupation for a far longer time than was at my disposal. I contrived, however, favoured by very fine weather, to get a few good negatives of a place which no true Briton can contemplate without pride and interest. Long as it has been in our possession, a certain degree of ill-will still rankles in the hearts of the original possessors, who, it is evident, have not relinquished all hopes of its recovery, for in the Spanish garrison orders on the mainland the phraseology still runs thus: "*During the temporary occupation of Gibraltar by the British, the guards will mount at Saint Roque.*" Every day, however, sees the military power of Spain dwindle, while England, far from allowing the consciousness of security to permit her to relax her vigilance, or even to remain *in statu quo*, is every day adding to the stupendous fortifications which have long gained Gibraltar the reputation of impregnability. On every side progress and activity in the work of defence is going on; new batteries are arising, and 68-pounders replacing 32-pounders; so that, to say the least of it, the Spaniards exhibit a most praiseworthy and patient faith if they really look forward to the day which shall dawn upon Gibraltar as once again an integral part of Her most Catholic Majesty's dominions.

From Gibraltar I was suddenly recalled by business. I am happy to say, however, that the Photographic Society of Ireland is still most adequately represented among foreign scenes; and I hope and expect that our worthy representative, Captain Henry, will on his return be able to bring before your notice a much better batch of foreign stereographs, and to conclude in a much more able manner than I have commenced it, the subject of photography for the tourist.

The Waterhouse Diaphragms.

To the Editor of the Photographic Journal.

Stone Vicarage, Aylesbury,
March 18, 1859.

SIR,—I find, among the "miscellaneous articles" in the last Number of your Journal, that a claim is made by Mr. H. R. Smyth to be coheir with Mr. Waterhouse of the "Waterhouse diaphragms." Mr. Smyth very properly "by no means wishes to impute to Mr. Waterhouse that his description was the result of information from others who had previously seen his (Mr. Smyth's) apparatus," and only wishes to clear himself from the impression that he claims any discovery fairly belonging to a brother photographer. Mr. Smyth is, no doubt, in 1858, an independent discoverer of what had ceased to be a "novel mode" of applying diaphragms; for Mr. Waterhouse described his method to me in the winter of 1856, and then wished me to take his camera to London to be suitably fitted up. I need not say that a diaphragm has always been looked upon as a *sine qua non*. In earlier years Ross placed the diaphragm externally; but it was very soon found that in a portrait-combination the proper place was between the lenses; and accordingly, before the arrangements of Mr. Lake Price and Mr. Waterhouse were published, most professional photographers inserted cardboard with the required aperture.

I must take upon myself the responsibility

of Mr. Waterhouse's publication. As I thought his arrangement superior, both in simplicity and lightness, to that of my friend Mr. Lake Price, I often urged him to send a description of it to the Journal, and only prevailed at last by assuring him that if he did not, I would. Mr. Smyth may therefore rest assured that, though his secret was openly shown in the West Riding, yet it was not alluded to at the last meeting of the British Association, and it never reached Mr. Waterhouse till he and I saw it together in the Journal, when I said to Mr. Waterhouse, "you have done that, and done it better." J. B. Reade.

On the Aplanatic Lens.

To the Editor of the Photographic Journal.

Dublin, April 2, 1859.

Sir,—I trust that the suggestion of Mr. Eliot, contained in your last Number, will be speedily carried out by the Society. It only requires that it shall be well and impartially done to be of considerable advantage, not merely to tyros, but to the more practised photographer. It should also be of advantage to those who are directly or indirectly concerned in the manufacture of such lenses as possess one or more essentially good qualities, to have these recognized by a committee of competent judges; and doubtless each manufacturer of lenses who has confidence in their merits will be happy to bear his part in affording every facility to such a committee.

As some time must elapse before the proposed Committee can be expected to make a report, and I desire that meantime no misconception should exist as to what "niche" I conceive the aplanatic lens to deserve of holding amongst its competitors, I desire to take this opportunity of mentioning that the "Note," originally published in last year with the price list of the aplanatic lenses, now requires a slight modification.

In the "Note" referred to, it was stated that the curvature (or departure from straightness) of the lines in the image given by the Petzval form of lens was equal to and contrary to that given by the aplanatic. Since this Note was written, an orthoscopic lens has appeared in which this curvature is reduced by one-half. The case now stands thus:—For a given focus and field, say about 15 inches for the former and 10×8 inches for the latter, a line traversing the length of the field, and situate near the margin of same, is curved, in the orthoscopic lens alluded to $\frac{1}{8}$th of an inch, and in the aplanatic $\frac{1}{16}$th. I would caution any photographer repeating such trials, not to take the *nominal* focus of a lens as being correct. The orthoscopic lens used in my experiments was one described as having its "back focus of landscape combination" $13\frac{1}{2}$ inches. I do not pretend to explain this apparently mystical definition; but I apprehend that most photographers would be inclined to conclude it to mean simply the focus of the combination as it stood. Now, the equivalent focus of this orthoscopic lens I found to be, not $13\frac{1}{2}$, but $16\frac{1}{4}$ inches nearly; and as the curvature of a field of fixed dimensions, and for lenses of precisely the same construction, but of differing foci, varies inversely as the third power (or cube) of the focus, it follows that, had the focus of the lens been $13\frac{1}{2}$ instead of $16\frac{1}{4}$ inches, the curvature of the image for any given field would have been very nearly doubled.

I think it of some importance to direct the attention of those who use or try the aplanatic lens to such matters, being aware that the power which this lens gives, beyond that of other constructions, of extending the field covered, with adequate distinctness, is leading photographers to make use of such power, and may lead to very erroneous estimations of the curvature, the latter increasing in so high a ratio with the *angular* extent of field.

I would also desire to observe here (the aplanatic lens being described in the "Note" as "*nearly*" corrected for spherical aberration), that I find it to be *quite* as well corrected in this respect as is the orthoscopic lens which has lately come under my examination. The peculiar and inseparable disadvantages of the Petzval or orthoscopic form for out-of-door work will be more appropriately treated of in a separate communication.

Thomas Grubb.

Method of Rapid Photography upon Paper:—Dry Manner — Wet Mode — Development of the Image by means of Sulphate of Iron.

[Translated from *La Lumière.*]

Since the discovery of collodion, photographic proceedings upon paper are almost discontinued, and with very good reason. Collodion works with more correctness and rapidity. Nevertheless, if two impressions of the same subject be compared, one taken upon collodion, the other upon negative paper, it is to be remarked that the impression taken upon paper is richer, softer, more aërial, more profound,—in a word, more *artistic* than the other. This difference in results has led me to new trials upon paper, in order to obtain the precision and dispatch procured by the use of collodion.

The method which I submit to the judgment

of your readers will, I trust, accomplish this object, and will re-establish negative paper in the place it occupied originally in photographic proceedings. As the base of my new experiments, I have chosen the gelatine employed by one of our most able artists, M. Baldus; this substance effects no change upon the silver bath, and preserves all its limpidity. In following his method, I obtain more delicacy by passing *un encollage* over the paper before iodizing it, and more rapidity by immersing it in an etherial alcoholic bath of iodine before placing it in the silver bath; besides, these two operations are in addition to the methods of M. Baldus. I develope the image with sulphate of iron, which is, we know, the most rapid means of development. I give now the method just as I practise it. I choose paper of the most even quality; I mark one of the sides with a lead pencil; I then spread over it the following application, composed of rain-water 22 ozs., gelatine 150 grains. I let the paper float for a few minutes in the bath, after which I take it out and let it dry by suspension. I prepare in this manner a number of sheets, and when they are dry, I collect them in a portfolio, which is then put under a press until the next day.

To iodize the paper:—

Of the above solution of gelatine. . 16 ozs.
Iodide of potassium . . . . ½ oz.
Bromide of potassium . . . . 46 grs.

I dissolve the whole by heat, and pass it through a cloth, into a vessel kept warm on a bath. I then prepare my papers as upon the previous evening, having carefully avoided bubbles of air, and placed each sheet of paper upon the side already prepared. After desiccation, I enclose them in a box kept in a dry place. This double preparation gives greater delicacy to the impressions, renders the paper unalterable, preserves its whiteness, and never produces spots, which is easily understood, because the iodine does not come in contact with the substance of the paper, which often includes substances of various natures, which neutralize a certain ray, and produce, when the image makes its appearance, a number of minute spots which injure the impression in a manner not to be repaired. This preliminary process of sizing over is therefore of undoubted necessity.

To sensitize and produce the luminous impression.—At this period of the process, in order to make use of the paper, I hold it by an angle or corner, by means of a small iron hook, varnished with gum-lac dissolved in alcohol; I then immerse it in the following bath:—

To sensitize—

Ether. . . . . 1½ oz.
Alcohol . . . . 4½ ozs.
Iodide of potassium . . . . ½ oz.

The paper imbibes this preparation instantaneously. If I mean to operate in a dry manner, I raise the sheet of paper, and dry it by suspension; in the contrary case, by the damp manner (or method), I spread it out, the face upwards, on the silver bath serving for the negatives with collodion. After two or three minutes of contact, according to the temperature, I raise the sheet of paper, and place it immediately upon the glass of the dark slide to receive the impression. The time occupied in exposure is nearly the same as for collodion; nevertheless I make the observation that a bath of silver, with the addition of acetic acid, gives more sensibility to the paper. For any other photographic process that I am aware of, the acid retards the luminous impression, while for this one the effect is the contrary. The acid opens the pores of the gelatine, swells it, and consequently renders it more permeable to the chemical action of the light.

Development of the image.—When the paper has received the impression, I plunge it in water with alcohol added, then I spread it over the solution filtered with sulphate of iron, having already served for collodion.

The image afterwards appears in all its details; if it should want vigour for want of balance, I let the paper soak, I spread it upon a glass plate, upon which I pour, commencing at an oz. commer., a weak solution of nitrate of silver, I then pass it a second time through sulphate of iron. This simple method of reinforcement is sufficient for all the intensity desirable. As will be seen, if one has a good stock of iodized papers, the manipulations are very simple, require but little time, and do not require a complication of new baths. But the principal advantage afforded by this method is the facility with which one obtains rapidly, by the dry manner, the most excellent proofs. I return to what I said above relative to the paper which I dry by suspension in taking it out of the bath. This drying of the papers by the dry manner is not imperative. I only indicate it as giving more facility to the work. I generally prepare from eight to ten sheets of paper; when I arrive at the last, the first one, well soaked, is ready to be placed on the silver bath. After the two washings, which ought to follow the rendering sensibility to the papers, the other operations are the same as by the wet method. I have still some communications to make to you. One day when I had impressed two papers with the same

subject, I treated one with sulphate of iron, the other with gallic acid. The proof submitted to sulphate of iron developed most rapidly, and gave me as usual a good impression; the one placed in gallic acid revealed no trace of any image. Nevertheless I felt certain that the paper must have received an impression, for the time occupied was precisely the same as by the proof developed by sulphate of iron. In order to increase the rapidity of the image, I added to the bath of gallic acid some drops of nitrate of silver, then waited for an hour without any result. At last, feeling impatient that the image did not appear, I took a phial, containing an old bath of nitrate of silver, which formerly had served for several experiments; this bath contained ether, alcohol, iodine, acids, and a little sulphate of iron. I decantered the clear part of the liquid, and then poured a sufficient quantity of it into the solution of gallic acid. Being afterwards engaged in other operations, I left the impression alone, as an attempt which had failed. An hour afterwards, on re-entering my laboratory, I was surprised to find the image perfectly developed; but what astonished me still more was to find that the bath reducing it had not experienced any alteration.

What can be the substance of the old bath which has maintained the gallic acid in such good condition? I address this question to my confederates and to all our photographic chemists. I think myself able to give replies to the following other questions:—Why is collodion the most rapid of all the methods employed in photography? Does this rapidity proceed from the pyroxyle which enters into the composition of the collodion, or is it due simply to the two substances in which it is dissolved?

Without pronouncing openly my opinion upon these questions, I think we must attribute to the ether and the alcohol united, this property of acceleration. In effect, I have been able to assure myself of this, by the preceding method, that ether and alcohol, imbibing the paper almost in an instant, render easy the combination of photogenic products, and consequently open a free access to the chemical action of light. These substances, ether and alcohol, are consequently most powerful agents in photography.

VERNIER, Jun. of Belfort,
Upper Rhine.

Hints on Copying Paintings by Photography.

To the Editor of the Photographic Journal.

Mansel Street, Swansea.

SIR,—In the last No. of the Journal, your correspondent H. inquires for some particulars relative to copying paintings by photography. The following hints may be of some service to him, and may, perhaps, be useful to others.

A piece of stained glass, light smoke colour, light green, or the palest amber, should be fitted in the lens tube; this will enable the operator to get the various colours of the paintings of nearly equal power, and in a great measure prevent solarization. Old collodion, almost useless for other purposes, will for this be just the thing. After exposure, the negative may be developed with

Protosulph. iron	2 drachms.
Beaufoy's acetic acid	1 drachm.
Alcohol	$1\frac{1}{2}$ ounce.
Water	$7\frac{1}{2}$ ounces.

When the details are well out, pour on and off the plate the following syrup, till all appearance of greasiness disappears:—

Coarse brown sugar	1 ounce.
Water	$2\frac{1}{2}$ ounces.
Acetic acid	1 drachm.
Honey	$1\frac{1}{2}$,,

A few ounces of this syrup taken with the rest of the apparatus will save the encumbrance of carrying a quantity of water, as it will do again and again. If the plate is now satisfactory, free from stains, &c., it may be put into the plate-box and taken home, when there well washed and cleared with cyanide, again washed, and then re-developed with saturated solution of bichloride of mercury in muriatic acid diluted with twice its volume of water.

When the picture has nearly whitened, well wash, and finish by dipping it in

Carbonate of ammonia	8 grs.
Water	1 oz.

Again wash the plate and dry it; varnish with spirit of wine and gum-benzoin.

THOMAS GULLIVER.

P.S. I have brought home frequently seven plates, $8\frac{1}{2} \times 6\frac{1}{2}$, by using only four ounces of syrup.

Instantaneous Dry Process.

To the Editor of the Photographic Journal.

Gennings, Staplehurst,
March 17, 1859.

SIR,—I have to-day taken a picture of clouds with a dry plate, which promises well for an instantaneous dry process. It is by no means a propitious day for the purpose; there is but little variety in the clouds; it is, in fact, quite a gloomy day, and blowing a hurricane.

The plate was prepared by the Fothergill process, with the addition of a small quantity of chloride of ammonium to the albumen solution, made of equal parts of albumen and water, without the addition of ammonia. It will re-

quire more experiment than I can make before the publication of your Journal, to determine the quantity of chloride of ammonium most suitable, but this will easily be determined; at all events, it is not sufficient reason for delaying my letter another month.

J. M. S. B.

ANSWERS TO CORRESPONDENTS.

March 29th.

DEAR SIR,—I met with this (to me) very unaccountable circumstance with respect to some collodion, which I am now about to state, and I should be much obliged by your inserting this in your next Photographic Journal, with the hopes that some of your numerous chemical readers may throw some light upon it.

I had some old collodion which I had prepared in May last year, but had kept uniodized, and as there were not above 2 or 3 ounces left in the bottle, I thought it would have become too much decomposed to be of any service. I added some old iodizing mixture to it to test it, and, as I expected, it soon changed colour, till in three days it became deep sherry-coloured; but now comes the curious part: I thought it was unfit for use, and was nearly throwing it one side; but two days after, on going to look at it, I found it rapidly getting paler, and to-day, only one week after iodizing, it is almost colourless again.

The iodizer was as follows:—

Iodide of Cadmium	15	grains
Iodide of Ammonium	15	,,
Iodide of Calcium	10	,,
Bromide of Ammonium	20	,,
	60	,,
Alcohol	4	ounces;

of which I put, by guess, enough to iodize at the rate of 4 to 5 grains an ounce.

The collodion, as far as I can recollect, was made of gun-cotton and pyroxyline, as 3 to 1, with equal parts of methylated ether, sulphuric ether, and alcohol. Unfortunately, I had no time to try experiments as to the sensibility of the collodion under the different changes, but I never yet knew an instance of collodion changing to a deep sherry-colour, and then losing all its colour again, without the addition of any other ingredient to it; it was in the dark, too, all the time, and in a bottle which will hold about 12 ounces, and only 3 ounces in it, so it had all the disadvantage of having a great proportion of atmospheric air in the bottle. I shall test the sensibility of the collodion in a day or two, and carefully keep it by me to see whether it undergoes any other metamorphosis; but I am anxious to know whether any of your readers have ever experienced the same thing, or whether they can in any way chemically account for it? The calcium salt has something, I fancy, to do with it, being very unstable of itself, but not so when mixed with other iodides. I have some iodide of calcium which, though corked up in a bottle, has liquefied and turned the colour of tincture of iodine, and yet practically in collodion it is more stable than iodide of potassium or ammonium.

C. P. CLEAVER.

The reabsorption of the iodine may perhaps depend upon the employment of methylated ether, many samples of which possess this property. When bromide is present in the iodizing solution, the loss of colour takes place with unusual rapidity. No exact explanation can be given of the change, but a compound organic body appears to be formed, which shows an acid reaction to test-paper. Wood naphtha also absorbs iodine rather freely, and much of the commercial absolute alcohol contains small portions of this substance.

Mr. Slater.—The linen may be kept in the nitro-sulphuric acid for twenty minutes; try a mixture of 6 ounces by measure of strong oil of vitriol, 6 ounces of strong nitric acid, and 1 ounce of water at a temperature of 140°. Linen and flax both require a nitro-sulphuric acid of a different composition from that which would be used with cotton-wool.

R. G. (Madeira).—Mr. Hardwich desires to thank you very kindly for the beautiful specimens of pictures by Fothergill's process. Dissolve the chloride of gold in water, 8 grains to the ounce; no decomposition will take place if organic matter be absent.

Rev. R. K. Edwards.—Many thanks for your very satisfactory picture of Ryde. It shows with how much advantage Mr. Archer's camera may be used in giving extra exposure to the foreground of a picture.

E. D. (Melton-Abbott.)—1. Unless you have apparatus especially adapted for the purpose, you will find it very difficult to enlarge a negative, and even when done, it is never so sharp and well defined as the original. 2. The less you do to the bath the better; merely keep it covered to prevent the access of dust; many baths are spoiled by the addition of useless compounds.

W. Ireland.—We have no experience in the "Raspberry Syrup Process." A compound like raspberry syrup, which is constantly varying, can hardly be expected to produce uniform results. You had far better adopt some of the processes which have produced such beautiful results as were exhibited at our late Exhibition.

Reply to Photophilus (Kendal).—We cannot give the information you require, which would be unfair to our advertising columns.

N.—Your letter has been submitted to the Council of the Photographic Soicety.

Novice.—Several modifications of Mr. Pouncey's process have been recommended; a correspondent in the 'American Journal of Photography' suggests—"First, a mixture of gum-arabic, sugar, and bichromate spread on paper; upon this coating, when dry, evenly dust on sub-carbon powder; upon the blank surface spread the first mixture again." The Editor observes that his correspondent has had good success, and understands the subject *thoroughly*.

E. A. J. (Dublin).—An answer to your queries on the subject of copyright in our next.

R. G. (Isle of Wight).—The markings are caused by the dryness of your plate when the developing solution has been applied, so that it has not flowed over freely and uninterruptedly. The specimens sent are in every other respect very satisfactory.

Thanks are offered to several correspondents, some of whose communications are in type.

Letters of inquiry to the Editor can only be answered through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 83. APRIL 21, 1859.

SINCE our last Number appeared, the Right Hon. the Lord Mayor and Lady Mayoress have entertained at the Mansion House an illustrious assemblage, whose names have already appeared in the daily papers, to meet the President and Council of the Blackheath Photographic Society. A correspondent so graphically describes it in another column, that it leaves us nothing more to add, than to declare, in the language of the President, JAMES GLAISHER, Esq., F.R.S., "that the *soirée* was a great success."

The Photographic Gallery at the Crystal Palace, under the able superintendence of Professor Delamotte, is fast approaching completion. Such photographers as have not yet availed themselves of the privilege of sending contributions, should do so without further delay.

We believe the free admissions, which are intended to be given to exhibitors, will be distributed after the termination of the present month. As the Handel Festival takes place during the present season, no doubt the Palace will be a greater scene of attraction than on any previous year.

The Committee for collecting records of the present and past state of photography have received a donation from an old friend of the Society, B. B. Turner, Esq., who has on so many occasions devoted so much of his time for its benefit,—a copy of the "Pencil of Nature," by Mr. Fox Talbot, and four out of the six pictures which were exhibited by him at the Exhibition held at the Society of Arts in the years 1851–52, and then acknowledged to preeminently excel in beauty all other specimens shown.

The Rev. Mr. Raven has also given his beautiful picture done by the wax-paper process, for which the Photographic Society of Scotland lately awarded their silver medal; and Mr. Woodward, of Nottingham, his successful stereoscopic production, which secured him the prize of the Nottingham Society. Now that the latter may be procured by the remittance of a few postage stamps, we should rather recommend our readers to trust to their own inspection than receive any opinion of our own as to its just merits.

The Members forming the Collodion Committee fear that with some there exists a misapprehension as to the field of their operations; and they wish it to be distinctly understood that they commence their labours with a full determination to investigate the subject impartially, and without the least wish to advance the interests of any particular maker, or declare any relative value to be fixed on the manufactures of A, B, or C. They simply propose to state that a collodion made with such a formula possesses, in their opinion—proved by their own experiments—such and such properties. They think it is a duty they owe to

the public, to inform them, if possible, how they may, under certain circumstances, secure certain results. May we not ask a simple question in illustration? Having advised, to some extent, Dr. Livingstone as to his Photographic requisites, would it not have been much more satisfactory to those who formed the expedition, to have been told positively that a collodion prepared in a certain mode would remain unchanged in the hot climates they were about to visit?

It may be remarked, also, that the Members of the Committee, as selected by the Council, vary in their opinion as to the best modes of iodizing collodion. Having therefore determined a satisfactory form of plain collodion, they will experiment further to ascertain to what extent they can modify the results by introducing bromide, or by substituting iodide, of cadmium for the potassium salt usually employed. A little reflection will show that an investigation conducted in such a manner as is proposed by the Council, cannot fail to have a favourable issue, and to assist in clearing away some of the difficulties which beset the path of the beginner.

The Committee are about to appoint a chemist of acknowledged ability to satisfy themselves that formulæ, which may be submitted to them, will *bonâ fide* yield also the collodion supplied.

The following resolution was unanimously adopted at the first meeting, and which we trust will secure the attention of those interested in the proposed inquiry:—

"That this Committee do at once proceed to examine any samples of collodion which may be submitted to it for examination, in accordance with the resolution by which that Committee has been appointed, and that a notice be inserted in the next Number of the Journal, inviting the makers of collodion to send in samples of their collodion for examination accordingly."

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

Annual General Meeting.

April 12, 1859.

Horatio Ross, Esq. of Netherley, V.P., in the Chair.

The minutes of the preceding Meeting were read and approved.

The following gentlemen were balloted for and admitted ordinary Members:—Mr. William Houston, Mr. John Cramb, Mr. Peter Dow, Mr. John F. Sutherland, Dr. Richter, Mr. Swinton, Mr. S. Melville, Mr. Thomas Hog, Mr. John Inglis, and Mr. John Macnair.

The Honorary Secretary read the following Report by the Council:—

"The third year of the Photographic Society of Scotland being now completed, the Council have again to submit to the Members the Annual Report on the affairs of the Society.

"In the reports of the two previous years, the Council had the satisfaction of announcing the great success which had attended the Society during the periods respectively embraced in these reports. On the present occasion, the Council can not only announce that that success has been maintained, but congratulate the Members on the greatly increased prosperity which has attended the Society in every department during the past year.

"The list of Members of the Society has been increased since the report of last year by the addition of thirty-five new Members,—a fact which is the best evidence at once of the growing interest felt by the public in the art of photography, and of their appreciation of the utility and importance of this Society.

"During the past session several valuable communications have been made at the meetings of the Society, which have been published at length in the 'Photographic Journal.' Amongst the most valuable of these was one kindly written by a Non-member, Mr. Duncan, advocate, on the 'The Law of Copyright with reference to works of Photography;' and to that gentleman the Council feel that not only the Members of the Society, but all interested in photography, are greatly indebted for the very full and distinct account which his paper contained of the present state of the law on that subject. The Council have since learned with satisfaction that a Committee of the House of Lords having been appointed to inquire into the law of artistic copyright, there is good ground for hope that ere long the evils so much complained of in the law as it now stands will be remedied. The Council have taken steps to unite their efforts with those of other Photographic Societies for the successful attainment of an object of so much importance to all connected with photography.

"The Third Exhibition of the Society, which was this year held in the convenient and well-lighted saloon, No. 90 George Street, was universally pronounced to be in every respect superior to the Exhibitions of the two former years, containing as it did a collection of works larger in number, as well as higher in merit both in the artistic treatment of the subjects and in the manipulation of the various processes, than was to be found on any previous occasion. The Council are happy to be able

to add that in its pecuniary results also this Exhibition shows a most highly satisfactory advance on the Exhibitions of former years. The balance on hand on account of this year's Exhibition is £119 1*s.* 7*d.*, as contrasted with £23 10*s.* on the first, and £35 on the second Exhibition. It may be further mentioned, that the number of season tickets sold this year was upwards of 79 per cent. more than the number sold last year.

"To the Committee of Management of the Exhibition, Mr. William Walker, Mr. T. B. Johnston, and Mr. Scott Elliot, the thanks of the Society are due for the zeal and intelligence with which they discharged their laborious and responsible duties.

"Believing that it would not only tend to the improvement of the Society's Exhibitions, but would prove to photographers generally an incentive to the production of works of a high class, the Council determined last year to offer two silver medals for the two best pictures, respectively, produced and exhibited by a Member and a Non-member of the Society; and it was afterwards determined to leave the award of these prizes in the hands of the whole of the Members. The result has proved eminently satisfactory, as the medals have been given to Mr. Raven and Mr. Lyndon Smith by the almost unanimous award of the Members voting.

"As there is some difficulty in deciding between the relative merit of photographic portraits and landscapes, the Council would suggest that next year three medals should be offered for competition: one for the best picture of any subject, by a Non-member of the Society only; and the other two for the best portrait or group of portraits, and for the best landscape or other general view, respectively, produced and exhibited by Members of the Society only. The Council would further propose, that prizes should be offered for the most important and valuable communications on the chemical, optical, and mechanical departments of the art, made to the Society during the ensuing season.

"In connection with the subject of these medals, it must be a matter of some pride to the Members, that at the recent Special Meeting it was unanimously determined to present a gold medal to Mr. Fox Talbot, for his discoveries in photography. In thus conferring on Mr. Talbot the highest mark of its sense of the value of his discoveries which it is in its power to bestow, the Society likewise does honour to itself, as being the only photographic body which has yet made public acknowledgment of the great obligations which the whole photographic world owes to Mr. Talbot.

"The attention of the Council was recently directed to the propriety of securing permanent rooms for the Society, which might serve not only for the purposes of the Monthly Meetings, but might be open daily as a place of resort for the Members, where the various Photographic Periodicals might be found, specimens of new processes and apparatus exhibited, and the private collection of the Society permanently placed. But as the rooms which were offered were not entirely suitable for the purpose, and as the scheme would involve a heavy immediate outlay for furnishing, &c., as well as a very considerable annual charge for rent, taxes, coals, attendance, &c. &c.,—an expenditure which it is scarcely judicious for so young a Society to incur,—the Council determined to postpone the project for a time. They are, however, so satisfied of the benefits which it would secure to the Members, could it be safely carried out, that they recommend that as much of the Society's income as possible should be devoted annually to the formation of a Fund for securing permanent apartments.

"With this view, they would suggest that the purchase of Photographs in the Exhibition for distribution among the Members at the Annual Meeting, should be discontinued. This will effect an annual saving of nearly £50; and considering the comparatively small average value of the return which this gives to each Member in the shape of a photograph, it is believed that the discontinuance of this system will not be regretted.

"The Council would, however, recommend that Members should, as at present, be supplied, gratis, with the 'Photographic Journal,' the organ of the Society; and that, for this purpose, the agreement with the Council of the Photographic Society, which expires at this date, should be renewed for another year.

"Hitherto the ordinary meetings of the Society have taken place every month throughout the year, except in July, August, September, and October. But as many Members have left town by June, the meeting held in that month has not been well attended; and, accordingly, it is proposed that in future it should be discontinued, and that the Session of the Society should, like that of other Societies, commence in November and end in May,—the meeting in May being the Annual General Meeting.

"Another suggestion which the Council desire to submit, refers to Law XIII., according to which 'The Annual Subscription to this Society shall be One Guinea, and shall be payable on 10th March, yearly; the subscriptions of Members admitted after 10th March, in any year, being payable upon the admission

of such Members." The majority of admissions since the Society was established, have taken place during the Winter Meetings, and when the Exhibition was open; and as it was considered to be somewhat unreasonable to require payment of the same subscription for the current year from the Members admitted then, as from those who, having joined the Society six months before, had derived nearly double the benefit, it has been customary not to call for any subscription for the current year ending March from Members admitted after 1st January. But the Council consider that a better arrangement would be, that, as at present, the Annual Subscription to the Society should be One Guinea, payable in advance on 1st March yearly; and that the subscriptions of Members admitted between 1st March and 1st December should be One Guinea, and those admitted after 1st December Half-a-guinea, for the current year; the subscriptions being payable on the entry of the Members.

"Considering the increased outlay now incurred by the Honorary Secretary and Honorary Treasurer in connection with the Society, consequent on the great additions to the number of Members, the Council recommend that a sum of Five Guineas should be annually paid to each, to cover their expenses for clerks, &c.

"The laws of the Society require the retirement at this time of the President, the Senior Vice-President, the four Senior Members of Council, the Honorary Secretary, and the Honorary Treasurer; but these gentlemen are eligible for re-election. The Society has also to appoint an Honorary Auditor for the ensuing year.

"An abstract of the Honorary Treasurer's accounts* is annexed hereto, showing a balance on the general funds of the Society of £102, 2*d*., and on the Exhibition of £119 1*s*. 7*d*., giving a total of funds belonging to the Society at this date of £229 9*s*. 9*d*. A large increase has thus been made to the Society's funds; and it may be mentioned that the increase would have been very materially larger, had there not been an unusually heavy expenditure to be met during the year. The 'Photographic Journal' being now published fortnightly instead of monthly, the cost of copies for the Members has been upwards of £55; the die and medals have cost about £23; and £47 8*s*. has been expended in the purchase of pictures for distribution amongst the Members.

"On the motion of James Barlas, Esq., Secretary Scottish Union Insurance Company, seconded by T. Watson Greig, Esq., jun. of Glencarse, the report was unanimously adopted.

"On the motion of Robert Christie, Esq., Secretary Northern Assurance Company, seconded by A. F. Adam, Esq., W.S., the following gentlemen were elected office-bearers for the ensuing year:

"President, Sir David Brewster; Vice-Presidents, Cosmo Innes, Horatio Ross; Council, W. Scott Elliot, G. M. Tytler, Thos. Rodger, Wm. Walker, Alex. Young Herries, George Harvey, T. M. Raven, T. B. Johnston; Honorary Treasurer, H. G. Watson; Honorary Secretary, C. G. H. Kinnear; Honorary Auditor, John Cay.

"Thereafter, on the motion of John Cay, Esq., Sheriff of Linlithgowshire, seconded by D. M'Callum, Esq., C.E., the thanks of the Society were given to Mr. Kinnear for his services as Honorary Secretary during the past year; and, after a vote of thanks to the Chairman, who then left the Chair, the Meeting proceeded to ballot for the pictures purchased for distribution among the Members."

* "Balance in favour of the Society on General Account, as at 5th April 1859 .		£102 0 2
"Arrears of Subscriptions due by Members:—		
"1. For year 1856–57, considered recoverable . .	£1 1 0	
"2. For year 1858–59, do.[1]	7 7 0	
		8 8 0
"In connection with the Exhibition:—		
"Balance in favour of the Society, as at 5th April 1859		119 1 7
"Amount of funds as at 5th April 1859		£229 9 9

"[1] Of these arrears, two guineas have been recovered since the accounts were closed.

"Edinburgh, 9th April 1859.—I have examined the accounts, of which the above is an abstract, with the relative vouchers, and I find the same correctly stated and duly vouched.

"JOHN CAY, *Honorary Auditor.*

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith. The same proviso extends to communications to the Editor.

Photographic Soirée at the Mansion House.

To the Editor of the Photographic Journal.

Westminster, April 16, 1859.

SIR,—The reception at the Mansion House on Friday evening, by the Lord Mayor, of a

numerous assembly of amateur and professional Photographers, must not be suffered to remain without particular notice. Of course your pages will contain what I may call the technical and material account of the principal specimens of that art we all so love and cultivate; but there was something more in it. A meeting such as the one just gathered, marks in a peculiar manner one of the great changes in the phases of our habits, which has been long silently working in the under-currents of society. It is the first outward and visible sign, held forth in almost an official manner, of progress and the substitution of intellectual banquets in place of those almost bacchanalian revels which in my younger days marked the civic feasts. This observation may appear superfluous in the present day, when such a change has taken place in every class; but it is nevertheless certain that, until the photographical entertainment given by the Lord Mayor on Friday, no such public recognition of this change has been made in the City; and I hold it to be due almost exclusively to the influence which the art of Photography has exercised so widely. Every other branch of art and science has long flourished in its separate sphere, and especially have the popular attractions of Geology, Chemistry, and so forth, drawn crowds to the evening meetings and lectures of the metropolis; but to Photography has been left the honour of first filling the halls of the civic mansion with a crowd of followers devoted to this or to its congenial and sister arts.

When strolling round the rooms, and dwelling with delight on those beautiful specimens drawn by the sunbeam under the skilful manipulation of the Photographer, from every portion of the globe, it was impossible for an old man of the world to avoid forming the contrast in his mind with the feasts and scenes which every citizen of London must recollect as having been hitherto attended by the votaries of politics or good living. On the spot where I last heard an eminent statesman defending his political career, was placed a stereoscope which exhibited the moon as a brilliant globe, bringing palpably before the eye of the admiring youth the truth, hitherto only demonstrated by scientific arguments and deductions, that the heavenly bodies are spherical. Where I last observed an epicure gloating over the delicacies of the table, and indulging in the choicest products of the vine, were the most exquisite illustrations of minute insect and vegetable life, magnified to the human eye—the extremes of the wonderful works of God.

Photography is eminently a domestic art, but it must be considered also as a social one. The sedate divine, the acute lawyer, the learned physician, the patient chemist, the enthusiast of nature, with the ladies and younger branches of their families, crowded here to enjoy on a larger scale what the elegant resources of their homes afford them only on a more limited one.

With great good taste the excellent Civic Magistrate had not merely provided every example of the great progress Photography had made, but joined the attractions of the microscope and other scientific instruments, just sufficient to vary the philosophical enjoyment.

It must strike every reflecting mind, however, that the key-note of this overt act, attuning the mind of the care-worn citizen to receive intellectual rather than physical pleasure, has been Photography; and the cultivators of this art, as well as all who feel interest in the refinement of mankind, should be grateful for the step taken by the Lord Mayor; and we can only hope that his example will be followed in other corporations.

To Mr. Glaisher also, and the members of the Blackheath Photographic Club, great praise is due; and I would call on the many similar institutions so quickly establishing themselves successively through the length and breadth of the empire, to follow up the lead, and to substitute in their localities the "feast of reason and the flow of soul," as connected with our favourite pursuit, for the "Alexandrine feast and the flowing bowl." The ladies must certainly unite in this wish, and joining, as they may do, in the gatherings at such exhibitions, will contribute no small share to the delights thereof. The monarch who offered the prize for a "new pleasure" would now find a thousand hands proffering it, not for the reward, but for the sake of the art of "Photography." C. V.

Photographic Experience in Australia.

To the Editor of the Photographic Journal.

SIR,—I think that the accompanying extracts from a letter which I have lately received from a friend in Australia may interest some of your readers, and if so, I am quite sure that he would not object to their publication. As he is practically acquainted both with chemistry and photography, his remarks are not without value. I may add that he left this country in the summer of 1857, so that some of the chemicals experimented on must have been nearly eighteen months old at the date of writing.

F. HARDWICH.

"I mentioned to you in my last that pyroxyline taken out in bottles had a tendency to

decompose on the voyage—ether and alcohol to acidify—collodion ready-made to acquire the property of liberating iodine. I think, however, that the ready-made collodion suffered on the whole rather less than the materials taken out separately, so that for the future I shall get collodion ready-made, although I think it is better to make the iodizing solution out here. The corked bottles answered very well for keeping-in the vapour; but the cement round the neck is rather inconvenient, since, without much care, some of it finds its way into the bottle on opening.

"I have a quantity of collodion here which I made in England from paper pyroxyline, but it turns red at once on adding the iodizer. Let me tell you how it may be worked. If you keep the nitrate-bath on the verge of alkalinity, by filtering it through a funnel containing finely-divided oxide of silver, instantaneous portraits can be taken with the collodion in the open air.

"My plan is to iodize the plain collodion with a cadmium iodizer newly made. The result is, that it begins to be yellow after a little time, and in an ordinary bath produces very black and white pictures with any exposure. A balance must be maintained between the bath and the collodion, which I effect by making the former alkaline in the way above described. Temperature affects the working order of the bath more than that of the collodion, according to my experience. At a very high temperature, I have known the bath to go off acid in two or three hours. More failures arise here from the bath being out of order than from the collodion.

"In my last expedition into the Bush I took a picture with a splendid half-tone and intensity in six seconds, at eight o'clock in the morning, on a hot windy day; and two hours afterwards the exposure required was *five minutes* with the same bath and collodion. Even then, the picture was black and white.

"The amateur in a hot country should never import albuminized paper. I have tried fully fifty samples, and, with two exceptions, they were almost useless. The pictures sent will show what happens. The surface is dull and flat, and there is a yellow deposit in the substance of the paper which no hypo will remove. Sometimes the paper comes out from England good, but goes off afterwards, so that my advice is to albuminize on arrival.

"The preservative processes are not very much to be depended on in this climate, although I have been careful to give both the albumen and the oxymel a fair trial.

"I shall send you home some of my negatives on plates 10 × 8. I think that non-compulsory photography is one of the greatest sources of amusement."

Fothergill Process.

To the Editor of the Photographic Journal.

Leamington, April 10, 1859.

SIR,—A letter appeared in the Journal of March 21st, on the "Fothergill Process," which calls for a few remarks from me, inasmuch as it chiefly refers to former communications of mine upon the subject.

The writer, after paying a just tribute to the simplicity of the process, *and giving me credit for considering myself* the true elucidator of it, proceeds to test "the real value of information given respecting its manipulation and theory, that we may keep the good, and throw away that which is useless and unprofitable," in the following manner:—"I will ask, then, 1st, Is it imperative to use the *mystic* proportion of 4 drachms of water, and allow it to remain for the *magic* period of 15 seconds? *Mr. Prichard uses one-third more water for first wash*, and does not lay peculiar stress *upon the quantity*. 2nd. Must we, after albuminizing our plate, still measure with *religious accuracy* the very water to wash off the superfluity? Mr. Prichard, after albuminizing, pours on, in a *heathenish* manner, a large quantity from a jug. Which is right? If no difference, why perplex the brain of youthful photographers (I speak *feelingly for myself*) with useless minutiæ? . . . . . Calling peculiar attention to trifles is apt to remind one of 'the mountain bringing forth a mouse.'"

In reply, I have to inform Mr. Baly that Mr. Prichard, in his first communications, did *not* specify the quantity of water necessary for washing sensitized plate, and in a subsequent one he adopted the quantity (6 drachms for Stereo size, *one-half, not one-third*, more than the 4 drachms referred to) recommended by me; both the 6 and 4 drachms for this purpose were introduced by myself,—the former quickly giving way to "the mystic proportion of 4 drachms," not to be continued for the "magic period of 15 seconds," but until greasiness disappeared,—requiring about that "magic period" with a summer temperature, but in winter, when temperature is low, 30, and even 60 seconds. This latter fact I have, in order to keep myself "leader of the van" as "the true elucidator," drawn attention to, as well as others suggested by further experience, in another publication. The "mystic proportion of 4 drachms" was adopted for the satisfactory reason that, in comparison with the 6, it increased sensitiveness and diminished time and amount of silver required for developing, with-

out materially, if at all, injuring keeping-properties; in evidence of the latter, I have lately had shown to me, by Mr. Ebbage (a gentleman well known from the successful specimens of this process he lent for exhibition to Members of the Society), a plate prepared by him in *October*, and exposed and developed about the middle of *March*, which did not exhibit decomposition or deterioration in any way.

I have also to correct another error Mr. Baly has committed in representing that the amount of water for removing surplus albumen is or has been directed to be measured at all, much more with "religious accuracy:" an *approximation* to a certain quantity was *at first* recommended; but since, and for a long time, the directions have been for plates to be well washed at this stage of the process.

When Mr. Fothergill made known his valuable discovery, he merely gave the general principles of it, leaving the less important part, of ascertaining the best means of carrying it out, to others or after-experience; in this, as might be expected, improvements have been, and continue to be from time to time, suggested.

Mr. Prichard, who was the *first*, as well as for some time the most, and only *continuous*, successful operator, and by whom I was myself again induced to take up the process after having abandoned it, trusted for success, not to the *quantity* of water for washing a sensitized plate, but to pouring it on *lightly*, and allowing it to remain *only* until greasiness disappeared, and to the removal of albumen by (to quote Mr. Baly's words) pouring on, "in a *heathenish manner*," water from a jug,—certainly a very convenient vessel for the purpose. This plan answered well enough in the hands of Mr. Prichard, but, as after-events proved, not with photographers generally, to whom it allowed too great a latitude, both to over-dilute the silver solution by continuing the first washing too long, and the non-removal of surplus albumen from not continuing second washing long enough. The bulk of correspondents requiring further information having, from a combination of circumstances, directed their communications (amounting in the total to the somewhat formidable number of hundreds) on the subject to me, I became unmistakeably convinced of this fact; it therefore became necessary to enter into "minutiæ," *not* for the purpose of "perplexing the brain of youthful photographers"—some are easily perplexed—but of enabling them to take advantage of principles giving results *unequalled* by any other dry, and not surpassed, except in sensitiveness, by the wet process. In order to enable myself to do this, I undertook a series of experiments that resulted in my recommending the plan of proceeding published in a previous Number of the Journal, as also in my Pamphlet, which, when attention is paid to other "trifles," such as keeping fingers free from silver solution while handling albumen-plate, and *vice-versâ*, placing plates to drain on blotting-paper *upon glass*, avoiding contact with *new* wood—*particularly deal*, either during preparation or for keeping prepared plates,—using suitable materials, &c., I have had sufficient evidence, has not ended in "a mountain bringing forth a mouse," but the obtaining of the most charming negatives.

Mr. Baly next proceeds to ask—

"1. Are not the requisites for a sensitive surface a film of iodide or bromide, &c., + free nitrate of silver?

"2. Does not the superior sensitiveness of the wet process consist in the fact of more nitrate being present? If *yes* will answer these questions, it will be clearly seen that when Mr. K. tells us he finds washing with 3 or 2 drachms instead of 4 increases the sensitiveness, but diminishes their keeping-qualities, he is simply *echoing the experience of past ages*, and in reality does not add one jot to previous information on the subject." I cannot conceive what reference either of the above inquiries, or the deductions drawn from the answer to them being in the affirmative, has to a "dry-process" subject; and must confess that, up to the appearance of Mr. Baly's somewhat facetious, though not *very correct*, communication, I was in ignorance that I should be considered to be adding any great amount of knowledge to the general stock by mentioning the above simple fact, which was done merely to show how little water might be used, at the same time giving a reason why it was not recommended. As "past ages," however, are not supposed to have had any experience in the "Fothergill Process," and the circumstance had not before been mentioned, the "echo" referred to is mythical.

With regard to Mr. Baly's objections to my theory of the *modus operandi* of the preservative agent, albumen, nothing is advanced in them that has not already been answered; this also, like the former portion of his letter, contains inaccuracies: in one part I am quoted as stating the *moist* precipitate is *more sensitive* than the *dry*, whereas the contrary is the case; the conclusions therefore drawn from it are erroneous. The remark respecting tastelessness of the white of egg is too trivial; and its peculiar characteristic taste is too well known to render a reply necessary.

If the theory I have formed is wrong, and Mr. Baly or any one else will in a *fair spirit*

show it to be so, or suggest any improvement in manipulation, it will be received as a favour.

I have taken great interest in this process from the first, and watched with no little satisfaction its advance in public favour, at first slow, contending against many difficulties, but recently most rapid; and all my communications have been made with a desire to help its onward progress, and make its advantages more generally known.

In drawing this necessarily somewhat lengthy reply to a conclusion, I would state that, as neither Mr. Baly's communication nor the reply it has called forth tends to advance either the interest of our favourite art, or that good feeling which happily exists among the practisers of it, I must for the future decline noticing similar ones, your space and my time being far too valuable to be so occupied.

Alfred Keene.

P.S.—I have tried the addition of chloride of ammonium to prepared albumen, as suggested by your correspondent in last Journal, and find it to accelerate sensitiveness *three- or fourfold*. I have also tried it with *gum water*—half strength—and ammonium, which is still more sensitive, and quickly developes: the quantity I prefer of chloride is 6 or 8 grains to the ounce. The modification I consider a most important one, rendering this *dry* process nearly, if not quite, equal to wet in sensitiveness; but whether it will give the peculiar richness of half-tone of the original, remains yet to be ascertained. A. K.

New Portable Tent and Perambulator.

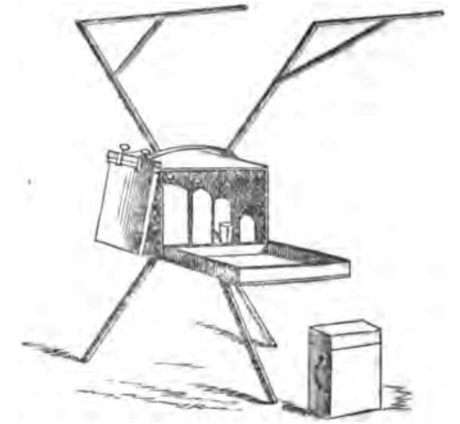
To the Editor of the Photographic Journal.

Leamington, April 12, 1859.

Sir,—As the time for out-door photography is now approaching, perhaps some of your readers might find the tent I am about to describe, rather more portable, cheaper, and more convenient than those usually employed. I have used it constantly for several years, and have found it very satisfactory.

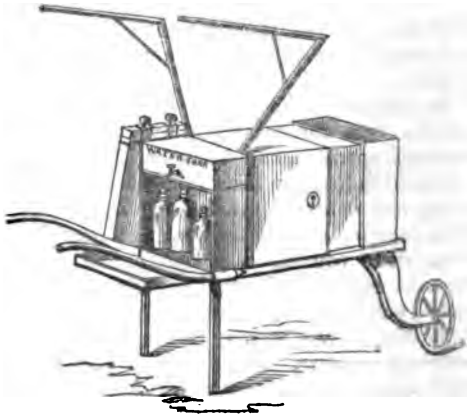
It consists of a box $12 \times 10 \times 8$, for plates 10×8 and under, with the lid made to fall in front, forming a developing-table. The bath is slung at the side, thus avoiding the necessity for the great waste of space which would occur if placed inside the box, as is usual with tents of this kind. The box contains the requisite chemicals, &c., consisting of a water-bottle, developing-solution, cyanide solution, collodion, developing-glass, and gutta-percha tray. The plate-box forms a seat; and a strap across the top forms a handle.

When required for use, the two supports, shown in the sketch, are screwed to the back of the box; a short leg is inserted in front; and the whole is covered with a black calico



covering, supported by the folding arms stretching out from the supports.

When packed for carrying, the legs are rolled



up with the camera-stand in the black cover. The cost of the whole is about fifteen shillings.

For a larger camera I use a kind of perambulator, with the tent placed at the back; this is still more convenient, as the whole apparatus can be wheeled by a boy. Two side wheels would be an improvement; but it would add to the expense, and would cause it to be charged for as a carriage if sent by rail.

I am now working with a Ross's Orthographic lens; and I find it has great advantages over the ordinary landscape lens. Groups of figures are often met with in the country, which make very interesting studies; and with this lens they can be photographed in a very few seconds, and the depth of focus, even with the full aperture, is much greater than with portrait lenses. I send a few groups taken in this way for your acceptance; the exposure of each was eight or ten seconds.

Henry P. Robinson.

Photographs in Red, Green, Violet, and Blue, by the processes of Niépce de St. Victor, improved by Victor Plumier.

[From 'Cosmos,' April 15.]

Red.—The paper is prepared with a solution of nitrate of uranium, containing 20 per cent. of the salt; the paper is left for 15 or 20 seconds in the solution, and then dried by artificial heat in the dark. It may be prepared several days in advance. The time of exposure in the camera varies, with the strength of the light and the intensity of the negative, from 8 to 10 minutes in sunlight, and from one to two hours in dull weather.

On being removed from the camera, the proof is washed for a few seconds in water at 122°–140° Fahr., then immersed in a solution of red prussiate of potash containing 2 per cent.; in the course of a few minutes the proof has acquired a beautiful red colour; it is then repeatedly washed in water until the water remains perfectly transparent, when it is allowed to dry.

Green.—To obtain a green colour, the red proof, obtained in the manner above described, is immersed for about 1 minute in a solution of nitrate of cobalt; it is not washed on being removed, and the green colour appears on drying it before the fire; it is then fixed by placing it for a few seconds in a solution containing 4 per cent. of sulphate of iron and 4 per cent. of sulphuric acid, washing it once with water and drying it before the fire.

Violet.—Violet proofs are obtained with paper prepared, as above, with nitrate of uranium. On being removed from the camera, the proof is washed in hot water and developed in a solution of chloride of gold containing ½ per cent. When the proof has acquired a beautiful violet colour, it is washed several times with water, and dried.

Blue.—To obtain blue proofs, the paper is prepared with a solution containing 20 per cent. of red prussiate of potash, and dried in the dark; the paper may be prepared several days before use.

The proof is removed from the camera when the isolated parts have assumed a slight blue tint, and placed for 5 or 10 seconds in a cold saturated solution of bichloride of mercury; it is passed once through water, and then a cold-saturated solution of oxalic acid, heated to 122°–140° Fahr., poured over; it is then washed three or four times, and dried.

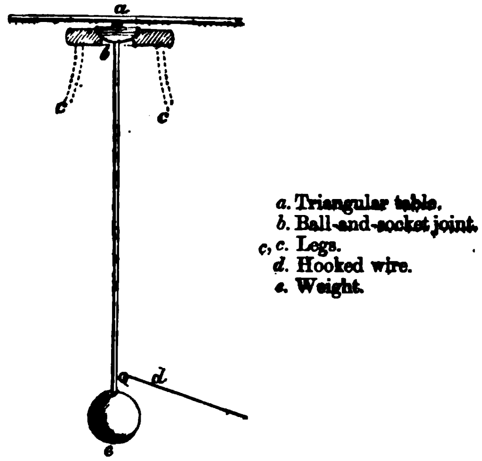
New Developing-Stand.

To the Editor of the Photographic Journal.

Cheltenham, March 10, 1859.

SIR,—I send you a photograph and section of a developing-stand which I have lately made, and which answers admirably. Perhaps some of your readers may think it worth copying.

It consists of a triangular stand about a foot in height, having the legs curved outwards for the sake of steadiness, and screwed into a



brass disk about 2¼ inches in diameter, the aperture in which forms a cup (see figure); a stout rod is suspended from this cup by means of a portion of a sphere attached to within ½ inch of its upper end, thereby forming what is usually known as a ball-and-socket joint; above this is screwed the triangular table for supporting the glass plates; to the other end of the rod is affixed a weight of about 3 lbs.; an eye is screwed into the rod for the purpose of moving the ball, so as to equalise the solution when being poured on the plate. It is obvious that the weight always keeps the bath in a horizontal position, rendering levelling screws unnecessary.

In the last Number of the Journal I see a note from Mr. Keith in reply to my query in No. 76, as to the reason for always placing the ground side of the focusing glass inwards. If there were any necessity for putting the glass into the frame from the outside, Mr. K. would be correct; but there is none. If it were put in from the inside, none of the difficulties alluded to in my letter could arise, and the difference in thickness of the glass would in no way interfere in focusing either with or without an eye-piece.

BAYNHAM JONES.

The Clairvoyant Stereoscope.

"MR. BENNETT, of Bishopsgate Without, has published a new and pretty case for holding stereoscopic views. This instrument has the

following advantages over the frames in common use:—It suits equally for examining opaques and transparencies, paper or glass impressions; it can be used to cover plates bound in books; it adapts itself to all angles of sight and focal lengths; it is easy to hold in the hand, and admits the light with a perfect freedom; it is pretty, compact, and can be put away out of sight. Against these virtues we may set one defect: it requires a little coaxing before it will act. A small screw to regulate the focus would probably set all right. With this glass we have looked over some bold and realistic stereoscopic pictures by Mr. Russell Sedgefield—views in our glens, cathedrals, landscapes, ruins—all dashing and vigorous, and some of them, especially the interiors, very striking in mass and shadow."—*Athenæum.*

We have transcribed from our contemporary the 'Athenæum' the above favourable opinion of Mr. Bennett's invention, and cordially recommend all those who wish to enjoy the use of a stereoscope without having their eyes perplexed, to possess themselves of it.

Mr. Llewellyn's Oxymel Process.

To the Editor of the Photographic Journal.

Hill House, Swansea,
April 14, 1859.

Sir,—I beg to inclose a print from a plate prepared according to the oxymel process of my friend and neighbour, Mr. Llewellyn. The printing is badly done, being rather over-exposed, the albumen paper some four years old, and the exciting-bath nearly a contemporary; but the definition of the plate itself is excellent. I am not aware that any of the keeping processes have ever succeeded after so severe an ordeal. I have a few more plates prepared at the same time.

The following are the facts:—Plate prepared, excited, and oxymelled in the usual way, as by Delamotte's printed instructions. Hardwich's collodion 1 year old, oxymel 1 part in 8 or 6, I forget which, but it is immaterial, as Mr. Llewellyn now uses 2 to 3 water.

Excited May 4, 1858, exposed April 14, 1859, for 6 minutes at 2·30 P.M., day gloomy, with a tendency to small rain. Diaphragm $\frac{3}{8}$th inch; camera, Murray and Heath, with Latimer Clarke's arrangement; developed fully in 4 minutes. Developer—

Pyrogallic acid	5 grs.
Gl. ac. acid	1 drm.
Dist. water	8 ozs.

with rather a larger proportion added from the bath than usually recommended; soaked from 2 to 3 minutes in plain water before developing.

The plate is cracked, I think, in consequence of the springs being too strong, but if you would like two or three more proofs; I think I might succeed, as it cracked on the first impression, and the one enclosed is the third, but the picture had adhered to the plate in the printing, and has since been loosened.

I. Thomas.

*** The specimen sent, as well as two others which have been submitted to the Editor, possess all the delicacy of fresh collodion, and indicate with how much advantage the oxymel process, as communicated by Mr. Llewellyn, may be used when it is requisite to ensure a protracted conservation of the sensitive plates.

Description of an Improvement in the making of large Reflecting Telescopes with Silvered Glass Specula. By M. Léon Foucault*.

At the Meeting of the Academy of Sciences of February 1857, the author described a new system of telescopes, the speculum of which was made of glass silvered by Mr. Drayton's process. Mirrors so constructed, upon their removal from the bath of silver, already possess the necessary brilliancy for being used in the telescope; but the brilliancy may be still further increased by spreading, with a piece of chamois leather, the pulverulent and non-adhering layer which partly hides the polishing of the silver coating.

Objections have been advanced against telescopes of this construction, on the ground of the fragility of the metallic layer, but experience has proved them to be unfounded. In the outset of his labours it occurred to the author that he could not do better than apply all his attention to the obtaining of spherical surfaces, the only ones which are produced regularly by mechanical means. In endeavouring to

* Communicated by M. De la Rue.

ascertain and to correct all the defects which exist in such surfaces, he succeeded in executing at pleasure all the ellipsoidal surfaces which establish the transition between the sphere itself and the paraboloid of revolution. As a preliminary to such labours he made himself acquainted with the various processes employed in the working of glass by practical experience in the workshop of M. Secrétan, the well-known optician of Paris.

As soon as a piece of glass which was being worked out began to reflect the light to a focus it was submitted to a course of optical experiments, by means of which it was possible to find the real shape of the surface. In the course of these experiments the author became convinced that surfaces, as formed by opticians, acquire their real value only at the final period of the polishing. They further served to establish this unexpected result, that the mechanical processes actually used in arts and industrial pursuits do not realize the spherical surface with such a degree of approximation as to stand the optical test. This circumstance suggested to him the idea of retouching polished surfaces with the hand in those instances wherein there existed defects, and of modifying them by means of local corrections, until light showed them to be irreproachable.

The author remarks: — "This operation, which is repugnant to practical men, answered better than one could have hoped. When attempted for the first time on a speculum of 36 centimetres (14 inches) in diameter, which exhibited a central eminence very prejudicial to the formation of images, it brought the surface back in a few hours to a figure which was sensibly spherical. Afterwards, by dint of several successive tests to which the surface was submitted, I established beyond doubt the fact that it is possible by such means to arrive at a true spherical surface. I then conceived the idea of realizing the parabolic surface with the degree of approximation necessary for the application I had in view.

"The method employed in effecting this transformation of the surface of the sphere is founded on the direction which the aberrations follow in the different positions of the conjugate foci of a concave speculum.

"If the speculum be exactly spherical, a luminous point placed at the centre of curvature produces at that centre an image which is free from aberration. But when the luminous point approaches the principal focus, the image recedes, and is surrounded by an image of aberration which increases with the distance.

"First, let us conceive that the luminous point undergoes only a very slight displacement, and that the image formed in its vicinity exhibits only a slight aberration, or the first indications of such. The speculum may then be corrected by means of a polisher of a suitable form until the aberration disappears; and as the mirror was spherical it becomes now ellipsoidal, by the duplication of the primitive centre in two corresponding foci at the places occupied by the luminous point and its image.

"This correction being made for the first distance of the two foci, it would be easy to find the value of that distance. Upon bringing the luminous point nearer to the mirror, new aberrations would reappear, which in their turn might be corrected by a similar process, and then the ellipsoid to which the surface of the mirror belongs would be increased in length.

"Pursuing the same course by a small quantity at a time, the ellipsoid is lengthened progressively until it is transformed into a paraboloid of revolution—that is to say, until the mirror has acquired the property of reflecting light to an infinite distance without any perceptible aberration.

"This method was first applied to a mirror of 25 centimetres (9·8 inches) in diameter, and was carried out only to a certain limit, so that the instrument collected in one focus only the rays emitted from a distance of 10 metres (23·8 feet). However, it has been thought desirable to maintain the instrument in this condition, in order that it might undergo other experiments, which, upon being repeated on a limited space, would demonstrate in a most decisive way the efficacy of the reflexion of the rays by the whole surface.

"A second mirror of the same diameter, the figure of which has been corrected in such a way that it became almost parabolical, formed in the tube of the telescope, at the distance of 1 metre (3·28 feet), an image, free from aberration, of objects placed at an indefinite distance.

"A third mirror, the diameter of which was 33 centimetres (13 inches), and the focal length of which was 2·25 metres (8·87 feet), prepared, like the others above mentioned, with much care in M. Secrétan's workshop, presented, just after being taken from the workman's hand, a figure of revolution well centred upon its axis, but which deviated very much from the figure of a sphere. Upon being subjected to a slight retouching it was very much improved, and the parts which were most salient have completely disappeared. Subsequently a second retouching, effected in a very short time, gave to the mirror a parabolic figure, and upon being directed towards celestial objects it was found to perform correctly.

"Although a surface of glass reflects only

$\frac{1}{10}$th part of the incidental light, it is not necessary to have the mirror silvered in order to become acquainted with the state of the surface. The light of a lamp, transmitted towards the observer by means of a partial reflexion upon the glass mirror, possesses sufficient intensity for exhibiting all the details which are interesting for the discovery of the formation of the focus. As for the asperities which modify the geometrical properties of curvature, they are in reality so infinitely small that a single rubbing of the polisher is sufficient to cause them to disappear, without the necessity of continuing the process too long. In the dimensions I have operated on until now, it has taken me only six hours to retouch a whole surface; a few minutes suffice to exhibit a sensible change. This mode of attacking the substance of glass admits of the operation being suspended at any time, and definitively terminated as soon as it is thought that the real figure has been acquired. Then comes the silvering, which increases the reflecting power without the least alteration of curvature being apprehended."

The author then proceeds to explain a method imagined by him for ascertaining the limits of the optical power of the instrument. He concludes with the following account of a trial which he made with a mirror of 33 centimetres (13 inches) aperture, and 2·25 metres (8·855 feet) focal length:—

"On the night of the 21st of July, under a pretty favourable condition of the atmosphere, we undertook an attentive examination of γ *Andromedæ*. This star (which, in refracting telescopes of 33 centimetres or less, is seen double, the principal star being of a yellow colour mixed with a little red, and the other a blue star of a greenish tint) is really triple, as Struve has shown with the Pulkowa refractor. The duplicity of the blue star is well known.

"During the whole night this feature of the double star remained doubtful; but at three o'clock in the morning, as the first rays of the sun were perceptible, the definition became very much improved; and upon applying a magnifying power of 600, the star was seen plainly divided into two small points very near each other.

"Two days afterwards, at the same hour, but with not so good definition, this observation was confirmed. Moreover, in order to guard against any imperfection which might attach to the instrument, a single star was observed, in order to ascertain if the image of the star was perfectly free from duplicity.

"An experienced observer took part in this examination. We have drawn on paper, separately and at sight, the same impressions; and afterwards, when the catalogue was consulted, we have succeeded in ascertaining that the positions were exact.

"It is, then, an established fact that the star γ *Andromedæ* was seen double with a parabolic mirror of silvered glass 13 inches in diameter and 8·865 focal length.

"These results, very satisfactory in themselves, are also of interest on account of the small expenditure which has sufficed to obtain them. Thanks to the liberal disposition and to the disinterestedness of the learned artist M. Secretan, who for the last two years has continued to place at my disposal all the mechanical resources of a large establishment, the expense of the process for obtaining them has been confined within such limits that a private individual could have borne them easily. I have no doubt that, by the expenditure of a sum of money comparable to what is usually laid out on astronomical instruments, it is possible to construct a telescope of comparatively moderate dimensions which would be capable of revealing regions of space hitherto inaccessible to vision."

On the Development of Positives in Daylight. By M. Davanne.

[From 'Cosmos' of April 15, 1859.]

Mr. Young was the first to ascertain the curious fact that, under certain conditions, positives might be developed with complete success in broad daylight. The secret consists in removing, by means of the hyposulphite, the iodide of silver not decomposed by light immediately after removal from the camera. Mr. Sidebotham repeated frequently with perfect success the experiment of Mr. Young. He says—"I have sensitized and then exposed for the usual time glass prepared with albuminized collodion; when the glass had received the impression, I immersed it first in a bath of hypo, then in one of pure water, washing with much water, in order to remove every trace of the hypo; I then suspended the washed plate in a light chamber and let it dry in the free air. A careful examination, frequently repeated, under the microscope, has shown, even after three days, not the slightest alteration in the layer bearing the proof; after that time, I developed with the ordinary solution of pyrogallic acid and nitrate of silver, and the development was accomplished perfectly well."

At a recent meeting of the French Photographic Society, M. Davanne exhibited some very satisfactory results of experiments made according to the directions of Messrs. Young and Sidebotham. But in addition he has sought and found the explanation of this apparently extraordinary fact, but which might

and ought to have been foreseen on the assumption of the very simple theory of the formation of photographic images propounded by him last year. Let us consider what takes place during the exposure in the camera. The iodide of silver struck by the light is decomposed, iodine set free; and the silver, left in a finely-divided metallic state, pictures faintly the image. By immersing the exposed plate in the hypo-bath the undecomposed iodide is removed, leaving the deposited silver, which forms the image, intact. The plate has then on its surface only metallic silver; and exposure to full light cannot alter this surface and so modify the image. To force it to reveal itself, or become developed, we have only to cause some fresh silver to come into contact with the thin stratum already deposited, which, yielding to the attraction exerted, is deposited in its turn, and so strengthens and perfects the image. Now, this is what happens when the solution of pyrogallic acid and nitrate of silver is poured over the surface, without the surrounding light being in any way capable of presenting an obstacle to the precipitation of the fresh silver under the influence of the preexisting layer. The development in broad daylight is therefore perfectly rational, and comes unexpectedly in support of the most simple and, at the same time, ingenious theory of the formation of photographic images. The truth of this explanation is rendered still more evident by the fact, that if, instead of removing the undecomposed silver by the hyposulphite, it be removed by cyanide of potassium, no image is obtained, because, at the same time, this salt would remove the silver forming the primitive outline or tracing of the image, and the deposit or subsequent precipitation on development would be perfectly impossible.

According to M. Moigno, the positives exhibited by M. Davanne left nothing to be desired: the tone was somewhat reddish; but the strengthening by chloride of gold would have caused this slight fault to disappear. It is possible, he states, that the development in broad daylight, which, when discovered by Mr. Young, was considered an anomaly, may some day come into general use; for it has the advantage, that we are enabled to follow with greater precision the development of the picture, and to stop when the practised eye considers that it has proceeded sufficiently far.

Carbon Printing.

To the Editor of the Photographic Journal.

Sidmouth, March 23, 1859.

SIR,—I beg leave to send you some specimens of carbon-printing by a slight modification of Mr. Pouncy's process; together with a copy from the same negative, taken by the ordinary silver process on albuminized paper for the purpose of allowing a fair comparison.

I have not seen any of Mr. Pouncy's pictures, so that I do not know whether those I have done are equal to his; but they appear to me quite as good as any I have been able to obtain by following his directions, and to be produced with rather less trouble than by his method; so that I venture to send an account of the process, in the hope that, if you consider it worthy of insertion in the Photographic Journal, it may prove useful as far as it goes.

It seems to be generally considered that the great defects of carbon-printing are a certain coarseness of appearance (provoking comparison with a lithograph), an exaggeration of the high lights, and a want of definition in the dark parts; so that, as a translation of the negative, there appears to be no question as to the superiority of the old process over the new in its present state. It is to be hoped, however, that the permanence of the latter will give it a claim to the attention of scientific photographers, who will effect improvements at present so much to be desired.

It occurred to me that if this coarseness of texture were unavoidable, it would at least be somewhat less disagreeable in a brown picture than a black one; and with this idea I substituted crude sepia for vegetable carbon, proceeding in other respects exactly according to Mr. Pouncy's directions. The result was to some extent satisfactory; but as I had found it extremely difficult to procure the sepia in its unmanufactured state, I thought I would try what could be done with the same pigment prepared in the cake form for the use of artists in water-colours. Of the specimens enclosed, one has been obtained thus with sepia, and the other in the same manner with a black (lamp-black, I believe).

The method of proceeding, it will be seen, is merely a variation of Mr. Pouncy's, consisting in the employment of colour ready prepared, instead of the troublesome process of levigating, and in the use of a brown colour instead of black, if preferred,—the inference naturally following, that if a blue, green, red, or yellow picture were desired, it could be produced by the substitution of those colours.

As, however, no good account of Mr. Pouncy's process has appeared in the Photographic Journal, I hope I may be allowed to describe it in full.

Rub up a quantity of the colour with water till it is so thick that you can only just pour it out of the saucer;

Of this take .... 1 part.
Saturated solution of bichromate of potass.................. 4 parts.
Common gum-water of the consistence of thin varnish .... 4 „

Mix, and, with a flat camel-hair brush, lay a copious supply on the paper, which should be placed on a board or slab of glass; leave it a minute or two to absorb, but do not suffer it to become dry in any part; then with a hogs'-hair softener, work the mixture thoroughly into the paper by a series of dabs or pats; holding the brush upright, at right angles to the paper; go over the paper in this manner from left to right and up and down, till it is partly dry and has an even tint of yellowish-brown, or yellowish-grey; the drying may be completed by the fire. The time of exposure varies from five or six minutes in bright sunshine, to perhaps an hour-and-three-quarters or more in a dull light. It is very unfortunate that the progress of the picture cannot be ascertained; as this is impossible, we must trust to practice and experience to discover the right time of exposure for each negative, though we have some guide in the fact that, if a picture turns out all high light and deep shadow, with no detail in the latter, it has probably been *over*-exposed, while, if the lights are dirty, the exposure has not been sufficient.

When the picture is removed from the frame, it must be placed, face downwards, in a dish of water, and suffered to remain there (in the dark) for five or six hours, at the end of which time, or before, the impression should be in a great measure visible. Sometimes, however, a picture may remain in the water for several days, if it does not come out freely, though, as Mr. Pouncy says, the best results are produced with only a few hours' soaking. The washing is completed by putting the print under a tap of running water, or by pouring water on it from a lipped jug. Lay it on a handkerchief to dry, and finish by passing it through a rolling-press.

It is almost needless to observe that the mixture must be kept, and the paper prepared, in a dark place.

Perhaps, Mr. Editor, I ought to apologize for taking up your attention with a matter so very simple as the above; I hope, however, that my excuse may be found in the wish to save others the trouble that I have experienced myself; for surely any practicable shortening of a mechanical process is useful, if only as a saving of time.

EMMA Y. HEINEKEN.

[Since the above was written, our correspondent has addressed us a second communication, not having seen in our columns a notice of using various colouring substances instead of carbon, and explaining that, when the above was written, it was supposed to have been the first application.

The success which has attended the manipulation, as evinced by the specimens sent, will, we feel assured, make the hints given acceptable to our readers.]

New method of Photography by means of the Solvents of Cellulose.

By M. D. VAN MONCKHOVEN.

[From the *Comptes Rendus* for March 28, 1859.]

As soon as I became acquainted with M. Schweitzer's discovery of the cupro-ammoniacal solvent of cellulose, I lost no time in ascertaining if it could be usefully applied to photography; and after some weeks of assiduous research, I succeeded in discovering an easy and cheap process.

The process, which at first sight appears the most rational, consists in dissolving recently-precipitated oxide of silver in the cupro-ammoniacal solution of cellulose, extending it on a glass plate, and washing it, when dry, with weakened hydriodic or hydrobromic acid. A white film of iodide or bromide of silver is formed; but I have tried every means to obtain a clear and transparent image, without being successful. In every instance, under the layer of cellulose a continuous film of reduced silver is formed, and the superficial image is lost. I have also employed in vain ammoniacal deutobromide of copper (of the composition $2\,CuBr, 5\,NH^3$), and ammoniacal iodide ($NH^2, 2\,CuI, 3HO$); a brown film of metallic silver was always formed under the image. I mention this fact in order to save others from making useless researches.

The following are the processes with which I have very well succeeded:—

The ammoniacal solution of deutoxide of copper is prepared, either by saturating concentrated ammonia with recently-prepared oxide of copper*, or, in a better way, according to the method of M. Peligot, which latter I advise photographers to adopt, as being extremely easy. When the solid impurities are quite settled, perfectly white cotton, at the rate of 10 drachms (154·32 grains) per litre (1·76 pint), must be dissolved in it. Thus a thick liquid is obtained, to which a little water must be added, in order to let all the cotton dissolve; then a concentrated solution of iodide of potassium, the strength of which has been previously ascertained, is poured into it in such quantity that every litre (1·76 pint) of the ammoniacal solution of oxide of copper

* I have prepared it by pouring a solution of caustic potass in slight excess into the ordinary sulphate of copper of commerce, and washing the precipitate well.

shall contain from 5 to 10 grammes (77·16 to 154·32 grains) of iodide. This is the liquid (which keeps perfectly well) which is poured on the glass plates.

I ought to say that on the preparation of the cupro-ammoniacal solution depends all the beauty of the photograph. The solution must be thick, it must flow slowly on the glass plates; and the layer, when dry, must be completely transparent without being dull. If the solution is too weak, the image is superficial, it disappears under a current of water, and cannot have any intensity. It is perhaps this fact, abnormal as it seems, which has hitherto prevented the application of M. Schweitzer's discovery to photography.

The ammoniacal solution is then poured on the glass plate, and it runs easily over it; as it evaporates slowly, if any part of the plate is not covered by it, the liquid can be made to cover the spot with a piece of tube. The excess of liquid is then left to run off, and the plate is placed on end against the wall. Here two modes of operating present themselves:—

1st. The plate is left for a few minutes only, for the purpose of evaporation: the layer becomes opaline, and the excess of liquid collects at the bottom; this excess is removed with a piece of tissue paper, and the plate is dipped in a bath of nitrate of silver, to which are added acetic acid and recently-precipitated oxide of silver. The layer is whitened by the iodide of silver which is formed as in the ordinary processes; the plate is exposed in the dark chamber, and the image is developed as usual.

2nd. If, on the contrary, the plate is left to dry, the ammonia being totally eliminated by evaporation, the ordinary reaction of alkaline iodides on salts of deutoxide of copper takes place; that is to say, protiodide of copper Cu^2I is formed in the layer of cellulose, and iodine is formed on the surface. In this case the plate is red when dry; when dipped in nitrate of silver, it gives a superficial image which the least washing takes off; and, moreover, metallic silver is formed under the image by the presence of the protiodide of copper. But I have sought to remedy this inconvenience—for this process would find many admirers, on account of its simplicity; and I have succeeded by dipping the plate into pure alcohol, into which I had passed a current of dry gaseous ammonia. The free iodine is converted into iodide of ammonium, and aldehyde is formed—

$$2I+2NH^3+C^4H^6O^2=2NH^4I+C^4H^4O^2.$$

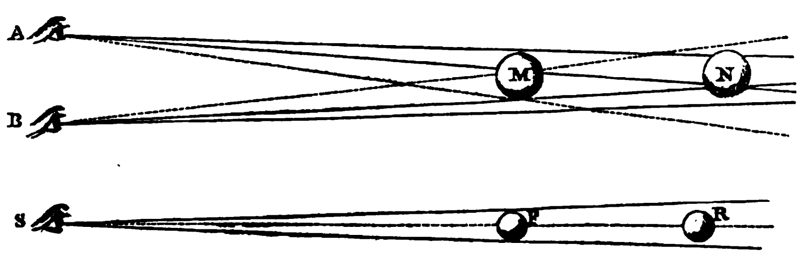
An immersion of a few seconds is sufficient to whiten the plate; it is then shaken in the air to let the excess of ammonia evaporate, and dipped whilst moist in nitrate of silver; the rest of the process is as usual. Thus are obtained most delicate and extremely transparent images, which are very useful for the reproduction of views where great delicacy is required. I shall say, in passing, that instead of ammoniacal alcohol, I have used pure water, gaseous ammonia, &c.; but the results were far from being so satisfactory.

In conclusion, cellulose will evidently replace gun-cotton in photography. The preparation of gun-cotton for photographic purposes is difficult, subject to numerous accidents, and of doubtful success. The process which I propose is extremely simple, very economical, and gives very delicate and rapid photographs, especially the first method.

I have not mentioned here a quantity of small practical details which would have made this notice too long; but I shall describe them at length in the special journals, so that persons who make photography their daily occupation or an agreeable pastime, may be able to succeed, as I have done.

From Leonardo da Vinci's 'Treatise of Painting.' Translation of 1721.

"The painters are apt to lament themselves, and quarrel with their own performances, because, in copying from the life, they cannot give their figures the same force and *relievo*



with which images appear in a mirror, urging that they have colours of greater lustre and shadows much deeper than any mirror exhibits, and laying the whole blame of their failure

upon their own ignorance or unhappiness in the management of them; but they herein abuse themselves, and impute that to their own weakness which is an effect purely natural. A painted figure must of necessity appear with less *relievo* than a figure seen in a mirror (though both superficial), unless both the one and the other be viewed with a single eye; the reason is this:—The two eyes AB viewing the two objects NM one behind the other, M cannot entirely intercept the sight of N, the base of the visual rays being so large that the further object discovers itself beyond the first; but if you only make use of one eye, as S, the object F will intercept the whole extent of R, because the pyramid of visual rays, issuing from a point, has the first body F for its base, by which means the second, R, of the same size, is entirely hidden."—(P. 48.)

Note by the Translator.—"Leonardo is a little obscure in this chapter, and may perhaps have been mistaken; the matter, in a few words, seems to be this. Every painting is a piece of perspective, and the figures in it capable of appearing with as much *relievo* as the natural objects they represent. But the figures in painting are all flat, so that we cannot turn round them to view their different sides, there being properly but one point of view from whence they may be well seen; whereas we survey all sides of natural bodies, and they always appear with the *relievo* they really have."—(P. 48.)

The above extract has been sent us by a valued correspondent, who evidently is not aware that Professor Wheatstone has referred to it in his Treatise on Binocular Vision, published in the Philosophical Magazine.—Ed.

REVIEW.

A Dictionary of Photography. By Thomas Sutton, Esq., B.A.

Every literary man knows the value of a good encyclopædia; when at fault, he turns to its pages, and in a moment the doubt is cleared up. In a similar way, every disciple of photography must continually feel the want of a good work of reference. No one man's brain can hold the immense mass of knowledge that has, even now, been accumulated on the subject of this newly-born science. To chemists it opens new paths, each of which is eagerly explored by a hundred seekers; opticians gain more fame by the manufacture of a new lens than by making a colossal telescope; and the name of the man who invents a good camera is "familiar in our mouths as household words." Nor does there appear to be any probability that photography will lose ground in public estimation. Year after year we see new journals started, devoted entirely to its interest; new shops opened for the sale of apparatus or of pictures; and on all sides we find the usefulness of photography more widely acknowledged.

It fortunately happened, that among the earliest and most earnest promoters of the Art were men who could use their pen as well as their brains; and the literature of photography already assumes a respectable appearance on the book-shelf. On ours, next to Hardwich's 'Chemistry,' stands Sutton's 'Dictionary;' and we hardly know to which we the more constantly turn; not that we mean to infer that Mr. Sutton can claim for his volume the same meed of applause which has by universal consent been awarded to Mr. Hardwich, but that, from the very nature of the work, the 'Dictionary' is very often referred to. And we must do the author the justice to say that it is seldom consulted in vain; generally we find the very information we want, and that in concise and clearly expressed language, which leaves us in no doubt as to its meaning. The author says that his aim has been to produce a work containing a plain statement of ascertained facts, and which may be relied on for accuracy. In this, as far as we have been able to judge from our own experience, he has quite succeeded.

The volume includes scores of such words as focus, aberration, cadmium, nitrate of silver, &c., all of which are treated in a concise way. The article on lenses occupies more than twenty pages; that on collodion and the different methods of using it, not less than sixteen; the word camera, eleven; the daguerreotype process, eight; the article on light, twelve; and the stereoscope, twelve pages; so that the book is not so much a dictionary (in the usual acceptation of the term) as a small encyclopædia. At the end there are several tables of English and French weights and measures, chemical equivalents, thermometrical equivalents, &c., which every reader of photographic papers will find extremely useful for reference.

Replies to several queries in our next.

Iris.—The glass positive picture exhibiting distinct colours is in the hands of Mr. Mattress, at the Publishers', who will show it you. It is, in the words of Milton,

"What the archchemick sun, so far remote from us,
With one virtuous touch produces."

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. Taylor and Francis, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 84. MAY 7, 1859.

"The palm-tree bendeth to the pine"—the Royal Academy salute the Photographic Society. At the dinner on Saturday last in Trafalgar Square, immediately after the private view of our May collection of pictures and sculptures, the health of the eminent gentleman who presides over Her Majesty's Court of Exchequer, as well as over the deliberations of the Photographic Society, was given from the Chair—not as the great legal officer of the State, but specifically as President of our Society. We have a right to feel proud of this homage—it makes us an institution of the country. On Saturday we took our place among the powers of the earth—with science, letters, and politics.

Sir Charles Eastlake made some graceful and gratifying references to the progress of the heliographic art, and to the influence which this study of life and truth must ultimately exercise on the hand and eye of the true painter. The Lord Chief Baron took up this theme where Sir Charles Eastlake laid it down. In reply to the toast, he said, "He accepted the toast on the part of the Society of which he was the President, with gratitude and pride. He knew of no body cultivating a particular branch of science, for the purpose of applying it to the uses of social life, which deserved more commendation and patronage than the Photographic Society. For photography he claimed nothing more than that it should be ancillary to the pursuits of the Royal Academy. The works of photography did not pretend to vie with the splendid productions in that room; but they had the singular felicity of showing where it was that accuracy of detail most contributed to effect, and where, in going beyond that point, the artist was neither true to nature nor obedient to genius."

Amidst the sound of preparations for war, the French Photographic Society have opened their Exhibition in the Champs Elysées; it will continue open until the middle of June. The exhibitors are numerous; and some of the productions are of unusual beauty—far surpassing any former collection exhibited in Paris.

PHOTOGRAPHIC SOCIETY, LONDON.

Ordinary General Meeting.

Tuesday, 3rd May, 1859.

Roger Fenton, Esq., Vice-President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. Malone having first asked whether the gentlemen he had recommended to be added to the Collodion Committee had been summoned, and having been informed that the Council had added their names, and that Mr. Heisd had declined the office, Henry Jeuld, Esq., was duly elected a Member of the Society.

The Secretary exhibited the picture taken by the wax-paper process, for which the Rev.

Mr. Raven received the prize of the Photographic Society of Scotland.

Messrs. Murray and Heath exhibited several novelties in apparatus, among which the most important were the following:—

A glass water-tight bath in a mahogany case, the cover being of *ground glass*, and kept tight by means of a spring of India-rubber underneath the bath; the cover so contrived as to be removeable without being actually separated. This bath has the advantage of allowing nothing but glass to be in contact with the solution.

A gutta-percha dipper of the silver dipper form, and intended for use with glass baths.

A plate-box for wet or prepared plates, with V-shaped grooves made of gutta-percha. The plates rest upon cushions of India-rubber; similar cushions are also fitted into the lid, to prevent vibration during transport. At the bottom of the box is a little drawer, in which blotting-paper is put, for the purpose of absorbing the drainings from wet plates. In order to dry plates, a current of air is made to pass through the box by removing the drawer and opening the lid.

A field box, with a partition for carrying chemicals, the fittings for plates being in all respects similar to the plate-box.

Folding racks for draining plates when cleaning, or for plates during preparation by the preservative processes.

A portable jointed stand, light and strong.

Mr. Mayall read the following paper:—

A New Collodion for Field-work.
By J. E. Mayall.

The prime requisites for a collodion for landscape photography are, that it shall be stable in its composition—not easily decomposed at the varying temperature to which it is liable to be exposed, that it shall not become troubled by agitation, shall contain within itself the property of absorption of some of the moisture to which it is unavoidably subjected, and that the film when silvered shall have good keeping qualities—not liable soon to dry, to fog, to spot, to tear, to come off the glass, or to the thousand-and-one difficulties to which the landscape photographer is now liable.

The bath, the developer, and indeed every part of the process should be looked at from the point of view, that the operator is in the country, far from the succouring aid of the chemist's shop, the advice of friends (which by-the-by is no great loss), or the accidental obliviousness of some important article left behind in the last hurry of departure.

I may remark that I have had these difficulties in view in perfecting the process which I have now the honour to read to this Society.

Preparation of the pyroxyline.—

4 ozs. red fuming nitrous acid of commerce, 1·450.
½ oz. water.
5 ozs. sulphuric acid, 1·830.
100 grs. blotting-paper.

Cut the paper into strips and slightly damp it with steam, mix the nitrous acid and water, and then add the sulphuric acid, in a bell glass very *thin* to stand the heat; put the paper into the acids with a glass rod, and cover up the vessel with a piece of flat glass; let it stand in a basin of hot water until the temperature of the acids reaches 130°, for 20 minutes; pour out the acids into another glass, and wash the paper as rapidly as possible to get rid of the bulk of the acid, and afterwards allow it to stand under a running stream of water six hours.

To the acid remaining from the foregoing process add 1 oz. of sulphuric acid, and then put into it, in small tufts at a time, 50 grs. of clean cotton-wool; get up the temperature of the acid to 130° again, soak half an hour, wash the cotton as before directed for paper, six hours in cold water, and dry at the ordinary temperature of the atmosphere; merely towards the last dry by gentle heat, and when dry, expose the pyroxyline to the rays of the sun for half an hour. The increase in weight ought to be at least 50 per cent.

Remark.—As it may be difficult to obtain acids of the exact specific gravity above named, the operator must, for weaker nitrous acid, use a little more sulphuric in proportion. An excellent plan is to try three samples with varying quantities of sulphuric acid until the exact proportions are found.

Mr. Hardwich recommends 140° as the temperature of the acids; and as he uses much more water, and sulphuric acid in proportion to the *nitric* acid, it can do no harm; but I find that on increasing the temperature beyond 130° there is a loss of weight in the pyroxyline, also it becomes powdery, which is not a good quality for negative collodion. *Observe*, the heavier the pyroxyline is from a given quantity of paper or cotton, the better is its quality.

Ether.—Pure or methylated, if well washed and rectified, and not acid, I find equally good: specific gravity ·720.

Alcohol should be especially prepared for this purpose: ordinary alcohol, sp. gr. ·820, should be well agitated with dry carbonate of potash and chloride of calcium for two days, say an ounce of each salt to 1 gallon of alcohol, to render it almost, if not entirely, *anhydrous*; then distil over, in a water-bath, out of doors.

The chemists prepare this, and no one who has not had considerable experience in this operation ought to attempt it. The alcohol thus prepared is almost as explosive as gun-cotton.

Collodion.—

20 ozs. of alcohol (anhydrous).
10 ozs. of ether.
120 grains of iodide of magnesium.
45 grains of bromide of ammonium.
2 drachms of chloroform.

Shake these chemicals well together until the whole is dissolved. Should the bromide of ammonium be difficult to dissolve, add a few drops at a time of ordinary alcohol to assist it, but not more. When perfectly dissolved, add 180 grains of pyroxyline from paper, and 60 from that of cotton; agitate well for two or three hours at intervals; try a plate; if the collodion is too thin, gradually add a little more pyroxyline, until the proper consistency is obtained. Here it is difficult to give the exact weight of the pyroxyline; for one kind is much more soluble than another, owing to some accidental circumstance in making it.

This collodion will keep excited for two years without any perceptible change, either from varying temperature, or when ordinary care is used to keep it from the light.

The iodide of magnesium has properties eminently qualified for out-door work; its easy solubility, particularly in the presence of a salt of ammonia, is well known to every chemist, and is indeed its chief characteristic to distinguish it from *lime* on the one hand and *strontia* on the other; and being such a powerful absorbent of moisture, it prevents the decomposition of the excited collodion. The bromide of magnesium is even more deliquescent, and is an excellent excitant also where extreme sensitiveness is not required, but not nearly so rapid as the combination above given.

In order that the amateur and practical photographer may not be foiled in his attempt to put this process into practice, I now give another formula that answers very well:—

20 ozs. of ether, sp. gr. ·720.
16 ozs. of alcohol, sp. gr. ·820.
144 grains of iodide of magnesium.
54 grains of bromide of magnesium.
3 drachms of chloroform.

Shake well together; then add sufficient pyroxyline to render the collodion of moderate consistency, say 8 to 10 grs. per ounce. Shake well again, and add four drops of a saturated solution of iodine in alcohol, and 18 grs. of bromide of ammonium; or, instead of this latter salt, 3 ozs. of old excited ammonium collodion will bring the mass into working order in twenty-four hours. Decant into 6 oz. bottles, and hermetically seal them for use. I may remark in passing, that the bromides are the true key to the middle tints. If you want excessive detail, as in leaves of trees and opaque objects, use more of the bromides; if you want intensity, use less.

Silver bath.—

50 grs. of nitrate of silver.
1 oz. of distilled water.
1 minim of glacial acetic acid.
$\frac{1}{6}$ minim of nitric acid.
$\frac{1}{4}$ grain of iodide of magnesium.

First, neutralize the solution of nitrate of silver with caustic potash, and then for every ounce of bath, with the $\frac{1}{4}$ grain of iodide of magnesium, precipitate a small quantity of iodide of silver from the nitrate; well wash the precipitate before adding it to the bulk of the solution of silver; stand a few hours, and filter; then for every 30 ozs. of silver bath add 30 minims of acetic acid and 5 of nitric acid, so as to render the bath decidedly acid. This bath will keep for any length of time by now and then adding a crystal of nitrate of silver to dissolve the excess of iodide of silver which accumulates in the bath, and every few days add a few drops of glacial acetic acid. A good plan is to refresh the bath with a 60-gr. solution of nitrate of silver, properly prepared according to the formula given; and refresh the bath every night after working. The gravity ought to be from 8° to 10°; if less than 8°, the bath must be refreshed with additional nitrate of silver.

Once a week expose the bath to the sun's rays for half an hour. No other collodion must be used in this bath.

As there is a large quantity of alcohol in the collodion, the film requires to be well set before dipping it in the silver bath.

Developer.—Two ozs. of iron tacks, and two quarts of water put into a stone jar with a cover, to which add 2 ozs. of sulphuric acid, and in forty-eight hours a solution of protosulphate of iron will be formed, of about the strength required for a developer. Of this solution take 10 ozs., to which add 2 ozs. of common acetic acid (30 per cent. acid) and 1 oz. of alcohol. One or two trials will indicate if the developer be strong enough: if the image of the camera comes out too quickly on spreading on the developer, reduce it with distilled water till the required strength of the developer is once obtained, and then observe it.

To refresh the *iron* jar again, add 2 quarts of water and 2 ozs. of sulphuric acid; cover the solution with a lid to exclude the air, and it will be ready when wanted. It will keep

better if 6 ozs. of alcohol be added to every 2 quarts of iron solution, and bottled off and kept in the dark.

Another developer.—

2 ozs. of protosulphate of iron.
1 qt. of distilled water.
4 ozs. of alcohol.

Solve the iron, and call this "stock solution."

To every 10 ozs. of protosulphate of iron solution add 2 ozs. of common acetic acid (30 per cent. acid).

A few drops of sulphuric added to the "stock" will keep the developer clear from fogging.

Always filter the solution just before using.

As the whole of this process is exceedingly sensitive to light, the greatest care will be requisite to exclude the stray light, both of the dark room, of the slides, and of the camera. Wash the plates well before fixing.

Fixing solution.—

12 ozs. of cyanide of potassium,
2 qts. of water,

either in a bath similar to the collodion bath, or by pouring on the plate separately.

Hyposulphite of soda is a good fixing agent; but I find the negatives fixed with hyposulphite bleach afterwards unless they are uncommonly well washed.

The practical photographer will at a glance see the value of this process as a whole.

First, this collodion is not liable to decompose; it is always the same; it contains within itself a powerful corrective of moisture, and consequently of decomposition. The bath is not liable to fog, as it is always decidedly acid, and requires to be so. It also contains slight traces of nitrate of magnesia, which is a preservative agent, and enables the plates to be kept a long time moist.

The mixture of paper and cotton renders the film much tougher; it will resist any amount of washing. Should there be any signs of reticulation of the film, it arises from the alcohol not being sufficiently rectified, and in that case more ether will be required in proportion, to remedy the defect. I have preferred to give the process just as I work it, no matter how it may jar with any theories, or any other practice. My friends who have taken the trouble to work it—some of them in the tropics, others at the antipodes, and others again in the icy regions of Canada—all write of their success; and should the indomitable photographer of this country find in it a process that he can take up and leave off at pleasure, without any of those mortifying failures which sometimes overtake the most persevering, I shall be amply repaid for the trouble I have taken in bringing it before the Society.

The CHAIRMAN called upon Mr. Hardwich.

Mr. HARDWICH had hoped that some other gentleman would have taken the initiative. He had received collodion from Mr. Mayall and tested it, and was bound to confess his favourable impression, although there were some points which he thought might be altered with advantage. He could not agree with Mr. Mayall as to his pyroxyline, and had mentioned to that gentleman the impossibility of obtaining blotting-paper of a uniform character, there being a great difference even in samples taken from the same ream. Mr. Hardwich believed that nothing but cotton wool of the best quality would make uniform pyroxyline. Another point, which was a most interesting one, was the use, in Mr. Mayall's collodion, of iodide and bromide of *magnesium* instead of iodide of potasium, sodium, or ammonium. Might not the results, however, depend simply upon the association of iodides with bromides? for it was well known that one great advantage in the use of bromide was that the collodion did not so rapidly change after iodizing. He would ask Mr. Mayall, whether he was prepared to say positively that the same amount of stability might not be obtained from the use of the iodide or bromide of any one of the alkalies, instead of the magnesium compounds; for it appeared that the commercial manufacture of the iodide of magnesium was a difficult process. The advantages of the iodide of potassium were known; and the iodide of cadmium was also satisfactory, because, after purchasing these compounds, and applying chemical tests, they were found to be pure and good; perhaps not quite so with iodide of ammonium, though that was better now than formerly. Mr. Hardwich had experimented with a view of suggesting a ready mode of preparing iodide of magnesium in the laboratory, and it occurred to him that, if he mixed atomic proportions of sulphate of magnesia and iodide of potassium, then dried it, and digested it in absolute alcohol, it would dissolve out iodide of magnesium, and leave behind sulphate of potash; he had made the experiment and evaporated to dryness, when the last portion of water evaporated with great difficulty, and vapours of hydriodic acid escaped; upon testing, he found that he had obtained iodide of magnesium, which he dissolved in collodion; but he could not make that collodion work at all; and the only idea which occurred to his mind at the moment was that a decomposition of the iodide ensued in the heating. If iodide of magnesium were prepared by chemists, how were they to make it in a way to ensure its purity? he therefore thought that the best thing would be to begin by ascertaining beyond a doubt that iodide of magnesium has a decided advantage over iodide of ammonium. Mr. Hardwich had examined the sensitiveness of Mr. Mayall's collodion very carefully, testing it on a very dull day with a uniform light, and found it *slightly* more sensitive than collodion iodized with iodide of potassium only, developed with pyrogallic acid. Mr. Mayall said that the bath should contain 40 grains to the ounce, which was a decided advantage. Mr. Hardwich obtained very excellent intensity on a fine day with portraits; but did not afterwards on trying it for landscapes, for he found the skies were metallic and weak. Mr. Hardwich rather inclined to the idea at that time, that in the hands of the amateur it was not a collodion which could be easily brought up to the proper point of intensity in landscape photography. Mr. Hardwich then suggested that a uniform plain collodion should be made, and tried with different kinds of iodizers, some containing bromide and some only iodide. If any one wished to go abroad to a hot country, by all means let him provide himself with a mixture of iodide and bromide in addition to the ordinary iodizer; but he did not ima-

gine that the bromides would altogether supersede the iodides, or that Mr. Mayall's collodion would ever supersede the ordinary collodion; nor did he agree with Mr. Mayall in his statement that the subject of pyroxyline was worn out, for he (Mr. Hardwich) thought it the very essence of the whole matter. As to the solarization, of which some complained, he thought that bromide was the best remedy for it; and it had therefore been spoken of by some as the key to the half tones. But his opinion was, that, with a pyroxyline of the best possible kind, every desired effect could be obtained with an iodide only.

Mr. T. Sebastian Davis had prepared collodion, and iodised it in different ways, but in one he had observed the singular fact that after keeping it some time the colour disappeared—the free iodine appeared to be absorbed; he thought this effect resulted from the introduction of a neutral combination of iodizing salts in the presence of a small quantity of bromide of ammonium. If he used only iodide of potassium to iodize plain collodion, he invariably found too much intensity, in whatever manner the pyroxyline might be made; that is to say, he did not get that amount of middle tints which was absolutely necessary for a perfect picture. He found in practice, that the introduction of a small portion of iodide of potassium in combination with iodide of cadmium gives a certain result, and theoretically arrived at the conclusion that iodide of potassium, however properly prepared, is not neutral; but by adding iodide of cadmium in its pure state, which has an acid reaction, the two together produce neutrality. In introducing bromide of ammonium, it was recommended at one time to unite the two in equivalent proportions; but his observations led him to the conclusion that it tamed down the pictures to too great an extent: he found the most advantageous proportions were about

$4\frac{1}{2}$ grains of iodide of cadmium,
1 grain of iodide of potassium,
$\frac{1}{2}$ grain of bromide of ammonium.

He particularly mentioned bromide of ammonium because it was very soluble; by mixing in the above proportions with collodion it had, after two or three weeks, become as colourless as water. There was a collodion which was well known, and was now largely used by some of our eminent photographers, which collodion contained iodide of cadmium; and that was perfectly colourless. As it was a mercantile article, he did not otherwise refer to it than by saying it was thought by many equal to any other, and had great keeping-qualities. With regard to the use of sulphuric acid in the making of pyroxyline, he thought it advisable to obtain the strongest. He had been in communication with one of the largest manufacturers for the purpose of obtaining a uniform sulphuric acid, and he found that the best commercial sulphuric acid of 1·850 was really purer than that of 1·840. With regard to the nitric acid, a weaker nitric acid was more advantageous than that of the specific gravity of 1·42; and as a certain amount of water was added by photographers to the acid mixture, it appeared unnecessary to obtain an acid of high specific gravity. The proportions he found to be satisfactory might be thus stated:—

Nitric acid ... 1·42...........	1 pint by volume
Sulphuric acid 1·85...........	3 pints "
Water	$\frac{1}{2}$ pint "

This formula contained a somewhat smaller quantity of water than that recently suggested by Mr. Hardwich.

Mr. John Williams thought it possible to procure pure bromide and iodide of magnesium. He had opportunities of becoming acquainted with the subject: he prepared first iodide or bromide of iron; to a solution of that, in a boiling state, he added caustic magnesia until the solution, when filtered, no longer gave a black precipitate with hydrosulphate of ammonia; he then filtered and allowed the solution to stand twenty-four hours, during which the excess of magnesia dissolved by the iodide is carbonized by absorbing carbonic acid from the atmosphere. The solution thus filtered is brought into a state of fusion, with great care not to employ too much heat; the substance then, if not pure iodide of magnesium, is the substance which photographers would use, and is as properly called so as the iodide of ammonium, of calcium, or any of the other iodides used by photographers. Mr. Mayall had mentioned nitrous acid, which was a rather indefinite term: pure nitrous acid could not be produced; the nitrous acid of commerce contained chlorine, sulphuric acid, and nitric acid in varying proportions. Nitric acid of the specific gravity of 1·45 was perhaps that which might best be depended on.

Mr. Shadbolt found one objection to the use of paper in the manufacture of pyroxyline, viz. that in all samples of bibulous paper that he had used there was a small portion of starch to give it body.

The developer which Mr. Mayall used was an old developer, used, if he recollected correctly, by the Martins of Paris, at any rate he had had a MS. of formulæ in his possession for the last five or six years, in which that particular formula appeared. Another remark had been made, upon the use of bromides and iodides in combination. At a *soirée* held at the Mansion House not long ago, he had been very careful in examining a specimen by Heisch containing a red and white camellia and green leaves; he used two equivalents of iodide for one equivalent of bromide in the collodion, which produced the details of light and shade in the red and in the white camellias in the most perfect manner possible; moreover the green of the leaves had as perfect a gradation of tone as any photograph he (Mr. S.) had ever seen; and that appeared to augur well for the combination where the colours were violently contrasted. Mr. S. had also a question to ask Mr. Mayall:—How did the presence of magnesium in the collodion prevent the absorption of water, the salts of magnesium being so greedy of water?

Mr. Malone said that Mr. Mayall told the last Meeting that he had a horror of mixtures; but he had departed from his fundamental principles. Mr. Malone long ago thought that a very simple collodion prepared by the Count de Montizon from cotton wool was the best: he perfectly agreed with Mr. Hardwich in their having to begin by studying fully the nature of the pyroxyline. Mr. Murray was the first, as far as he knew, to suggest the use of paper; and it was taken up immediately by Mr. Crookes. Mr. Murray used what was called nitrous acid; and although these points had been frequently discussed, he still thought the whole chemistry of the subject required investigation. First, the objection with regard to paper in the manufacture of pyroxyline was this—that it is certainly perfectly true that one cannot rely upon having the same substance in what is called blotting-paper, made even at the same mill, with what would be alleged to be the same materials. In the course of his experiments with Mr. Talbot, he spent a fortnight in one of the paper mills, and he found that, unless the whole history of a paper were known from the beginning to the end, it could not be known whether it might not consist of a mixture of linen and cotton in varying proportions. But, granting that it might consist of cotton, then it might consist of new materials or perfectly worn-out ones; and if so, the result would vary: therefore he said that, unless the blotting-paper could be watched from beginning to end, no certainty could be obtained; and that was an objection very difficult to meet, unless they assured that

their own materials were taken to the mill, as he did. He took a quantity of new linen; and the thing was watched from beginning to end. He could not say that it was necessary to have recourse to that process of wear and tear, though no doubt it gave a different result; but by taking cotton wool, they might get collodion as sensitive and as good as any of the collodions with which they were now dealing. He did not say that collodion was perfect; and it was admitted in the very statement of Mr. Mayall himself, who said, if the acids are not of the right strength, we must alter them. One gentleman has said that it is difficult to get acid of 1·45. I agree with Mr. Williams that that is the purest acid in the market; it is prepared by a well-known maker for the assayers; but we are not to conclude that, taking a weaker acid, say 1·20, it shall give a result similar to that of a strong acid diluted to 1·20. He (Mr. M.) had been told by a gentleman in the trade, that he was satisfied that there was some reason for what the late Mr. Murray had suggested, viz. that a mixture of nitrous acid with nitric acid was the best. Nitrous acid was usually the *omnium gatherum* of the acid-manufacturer; any old rubbish was put into a bottle and sent out as nitrous acid; and, although they were pouring contempt upon this acid, there might be something in it: and it might be remarked that it was of an orange-red colour, due to the presence of lower oxides of nitrogen; and after all, they ought perhaps to use a mixture of nitric acid and nitrous acid, and not nitric acid isolated. He would have each suggestion of each gentleman properly treasured up, and at a proper time give each gentleman his due; and in no other way could the subject be properly dealt with.

Mr. Hardwich said, as Mr. Williams had been good enough to give some information upon the commercial manufacture of the iodide of magnesium, he would ask him whether it could be obtained sufficiently dry to be weighed in the scale.

Mr. Mayall exhibited some iodide of magnesium in the required state.

Mr. Hardwich asked how it would keep in alcoholic solution.

Mr. Mayall said, very well.

Mr. Hardwich asked whether it could be obtained white.

Mr. Mayall said that it was white when it was newly made.

Mr. John Williams stated that, a few months since, he received twenty-four Winchester quarts of bottoms of *old* iodized collodion, from a large manufacturer, for the purpose of saving the ether. Of course it was withdrawn in the usual manner; the residuum was examined and washed, to save the iodide present; but upon examining it, there was found to be in addition sufficient oxalic acid present to yield with chloride of calcium one pound five ounces of oxalate of lime, which was a very unexpected result. Of course it could be seen where the oxalic acid came from; for the pyroxyline must have contained it in large quantity.

Mr. Hardwich asked whether that change might not have taken place in the distillation of the ether.

Mr. John Williams said it was impossible. He had since tried the experiment in newly-made collodion. There was distinct evidence of oxalic acid in ordinary collodion. He thought the oxalic acid was formed during the process of making the pyroxyline. The collodion was not Mr. Williams's own make.

Mr. Malone said that sulphuric acid acting upon rags formed a sugar, and this by nitric acid would yield oxalic acid; but in washing the pyroxyline, the oxalic acid ought to be washed out by the use of distilled water. If ordinary water containing lime were used, it would produce oxalate of lime.

Mr. John Williams said that that could not be the case, as it was certain the oxalate of lime would not dissolve in the collodion; the oxalic acid being contained in the fibre of the paper, it would not be washed out of the pyroxyline.

Mr. Hardwich thought that Mr. Williams's statement was one of very great interest; and it appeared almost impossible that such a quantity of oxalic acid could have existed in the collodion. He (Mr. Hardwich) thought that an oxalate might be formed by a reaction of iodide of potassium upon collodion during the distillation. He had treated collodion with carbonate of potash, and found a thick flocculent substance which was plainly organic. It was a most extraordinary thing; but he could not understand that the oxalic acid was produced in the original manufacture of the gun-cotton; he thought the subject could be pursued further with advantage.

Mr. Mayall stated that he could confirm Mr. Williams in the statement relating to oxalic acid; he (Mr. Mayall) had very frequently discovered it in an old collodion by precipitating it with lime and examining it by the usual tests. That was one of the reasons why he adopted the magnesium in the first instance; for if there were any oxalic acid formed, it would be precipitated; and as he now excited one or two gallons at a time, he frequently found a very thin film at the bottom of the bottle, of white precipitate, which was, no doubt, a precipitate of that kind, that was, an oxalate of magnesia or some one of the family: if there were any lime present in the magnesia, it would be an oxalate of lime. However, that was a very important index, and he had no doubt it was one of the hidden clues to their difficulties; and if no other fact were elicited than that, their time would have been well bestowed in attending this discussion. However, as Mr. Malone had reminded him of an observation he made at the last meeting, upon his horror of mixtures, he must deny that this was a mixture, more than was not only necessary but scientifically the best of its kind with which he was acquainted. He thought he might venture to speak from his experience of collodion, having been engaged with it since it was first discovered by Archer, and from the time he (Mr. Mayall) took his first lessons upon the subject from Dr. Diamond, which he believed was in May 1851; and he had from that time to the present made nearly all the collodion that he had used: he made it also with the desire that he should each time comprehend some of the difficulties which he heard others complain of, and which, in the early days of his experience, he found almost insurmountable. However, through good report and evil report, and notwithstanding the denunciation of paper, he had adhered to paper the whole of that time, and could only say that, whenever he had made a mixture of half paper and half cotton, he had invariably made a finer collodion, flowing more easily over the glass, leaving no reticulation, and adhering better to the glass. He knew Mr. Hardwich, in his work, used an immense quantity of water; and although he (Mr. Mayall) thought it a useful recipe, he very much doubted if such a quantity of water were the best recipe, because he was obliged to use a very large quantity of sulphuric acid to absorb that quantity of water; and although it might act upon the cotton to disintegrate it somewhat, he should hesitate before using that formula, because he might get a powdery collodion, and consequently a rotten film. However, he might state that the blotting-paper, of which he had shown a specimen, was Whatman's prepared blotting; it was the same as that used by the old calotypists; he thought he had used it since 1846: he had never had any difficulty in getting the same quantity of pyroxyline, either from an old ream that he had purchased years since, or a recent one which he had obtained lately; he bought it in St.

James's Street. They would find that, if they took one bundle of cotton and tried to make a batch of pyroxyline with it, they would succeed; but take another sample of cotton, and they would not; and in his opinion there was more difficulty with the cotton than with the paper. If they made six or seven baths of collodion, and tried each separately, what would be the consequence? If they took one, they would get a collodion that had, perhaps, great intensity; if they took another, it would have great detail; another would be tenacious; a fourth powdery; and then mix them all, and they would obtain a better; and then he would ask, what was that but taking the paper?—for from one batch of paper they would have many different collodions; for some of the papers are made from linen, and some from rags that were, perhaps, around the body of a Roundhead; at all events it would be a mixture from every possible source.

Mr. Malone ejaculated, "Never twice alike."

Mr. Mayall must confess, at all events, that in that paper it was very carefully attended to; and he had no hesitation in saying to that meeting, he could produce a collodion with that paper which he could work better than any collodion that he had tried; therefore he should not be beaten out of the principle that it was a good sample, because other gentlemen had not succeeded, when he had uniformly had success; and he did not recollect a single failure when he had used paper with the proportions and the acids he had named. As to the nitrous acid, they knew that there was a large quantity of nitrous oxide dissolved in it. Mr. Hardwich recommended nitric acid; he (Mr. Mayall) thought there was a great deal of difficulty in using that, and thought that Mr. Malone's opinion would be found to be something like the correct one, viz. that there were a quantity of inferior oxides of nitrogen dissolved in this red fuming nitrous acid, and they were not to take it for granted that it was the refuse of some manufacturer who happened to have an *omnium gatherum* in some dark corner into which he cast all his refuse. However, whatever might be said to the contrary, he recommended that as the acid with which he had obtained success, and it was the acid with which every one might succeed if he tried.

The next thing was Mr. Shadbolt's most important question. He asked him (Mr. M.) how it was that the salt of magnesium (which was itself so deliquescent) should have the power of preventing the collodion becoming humid. They all knew that the ordinary collodion contained a large quantity of water; in fact, if they had a very highly concentrated alcohol, they could not dissolve enough of chemicals—of iodide of potassium in particular; therefore a small quantity must be added: but if common alcohol and common ether were used, they would have an absorbent of moisture in the iodizing compound of iodide and bromide of magnesium; for they themselves took up six or seven volumes of water to one of the salt without deteriorating. Now that was the point; but was that the case with the iodide of ammonium or iodide of potassium? Nothing of the kind; for the moment they added iodide of potassium or iodide of ammonium, a decomposition was set up, hydriodic acid was formed, and it became pale yellow, then red, and finally not capable of being used at all; and that was simply because it had dissolved in the quantity of water that was in the ether or in the alcohol: and the image became consequently feeble. But one could continue the working of that magnesium collodion to a very large extent without that defect; and one of the advantages of the magnesium-excited collodion was, that if he took a bottle of that collodion excited a month ago, and a bottle excited six months ago, and a bottle excited two years ago, they would all produce precisely the same image: whether it were the cloudiest weather in winter or the hottest and finest day in summer, the same kind of image would be produced; and he asked the gentlemen who had spoken on the subject, if they could say the same of any one of the collodions which they knew or recommended: and that was the point to be discussed. He had no object in view but the greater perfection of the art; in fact every one imbued with a true feeling for the beautiful art, must desire that it should be freed from every possible error that surrounded it.

Mr. Mayall thought that Mr. Hardwich had made some very important observations; in fact, anything that Mr. Hardwich said was always received by the Society with very great weight, because he had paid a great deal of attention to the subject, and had brought an immense amount of scientific information to bear upon it. He wished some of the gentlemen who had time would take the matter up. It was well worth their attention, inasmuch as they could go out into the country under every possible condition, and produce a tolerable image. The uniformity of the iodide of magnesium was insisted upon; and he did not think he could say the same of any other excitant with which he was acquainted, except iodide of cadmium, which produces a ropy collodion, and does not spread well after being kept some time and being frequently poured over the plate and back to the bottle. Any Member could obtain the salt most carefully prepared by Mr. Williams; the salt that gentleman had prepared for Mr. Mayall had worked in the most desirable manner, and he had no doubt many gentlemen who went forth into the country and came back with smeared plates and very dirty hands, and not many results in the shape of pictures, would go into the country with this collodion and bring back good results, many of them very superior, and have scarcely one failure. He had given a friend from the West Indies two or three bottles of this collodion, which he had taken abroad; and a letter had since been received by Mr. Mayall, stating that the collodion was in exactly the same condition as at first, and worked well in that climate. He had also received a letter from Canada, which said the same; so that he did not think the theorists should put down a thing that was new, until it had been fairly tried; and he would assist any gentleman who would take up the matter practically. And as he believed the worthy Chairman was about to commence a series of experiments upon the subject, he hoped that in November they would be enabled to give some evidence that the magnesium collodion was not a myth, but that it was something which they could all take hold of, and by which they could produce results of which no gentleman need be ashamed.

The Chairman made some pertinent remarks upon the value of the Society, and such discussions as the present. He then stated his opinion in favour of the combination of bromide and iodide of potassium, and that, with respect to the iodide of potassium, there was the difficulty that it was almost always settling down in crystals at the bottom of the bottle—whether that arose from defective manipulation or want of knowledge he did not know; and he was always afraid to use collodion with large quantities of iodide of potassium in it. In following the directions which had been kindly given to him by gentlemen making the theory a study, he had produced a great many bad pictures, more than he could have done if he had followed on in the use of the simple collodion with iodide of ammonium, or any iodide easily soluble with the bromide of ammonium: that he had found the most easily worked, the most uniform in its results, and least affected by variation of temperature or climate. All that he had learned, he had learned by constant failures, with occasionally here and there a success; and if the method of producing the collodion described

to the Meeting should prove to be successful, or if Mr. Hardwich, or any of the gentlemen who experimented upon the subject again, would point out a better, the Society would, as humble disciples, thank them for their information.

Some conversation ensued between the Chairman, Mr. Mayall, and Mr. Malone, as to theoretical and practical chemists and practical photographers, for which we have no room.

The Meeting was then adjourned to Tuesday, 7th June.

PHOTOGRAPHIC SOCIETY OF IRELAND.

This Society met in the School of Art of the Royal Dublin Society, on the evening of Friday, the 29th of April. After the ordinary business of the Society was disposed of, the Chair for the evening Meeting was taken by JOSEPH KIRK, Esq., R.H.A.

Mr. H. M. MANUS, Head Master of the School of Design, read a paper "On the Treatment of Drapery in Statuary," in which he gave many valuable hints to photographers on the subject of posing draped figures, and congratulated the Meeting on having so distinguished a sculptor as Mr. Kirk occupying the chair on the occasion.

Sir J. JOSCELYN COGHILL, in observing on Mr. M. Manus's paper, took occasion to produce a photograph executed by Mr. Robinson of Dublin, representing "The Death of Chatterton," the well-known picture lately exhibited at Manchester.

The photograph, however, was not taken from the picture itself, but from a real scene which represented it.

Mr. Thomas Brownrigg then read the following paper:—

Remarks on Landscape Photography.

As the season for out-of-door work has now fairly commenced, it occurred to me that some remarks on landscape photography might not be uninteresting to those amateurs of our Society who have not had much experience in this branch of the art.

The taking of views must, after all, be the main *forte* of the amateur photographer; for although most beginners commence with taking portraits behind a door or at the back of a wall—for but few have the luxury of a glass room—they find that their productions cannot come up to those of the professional artist, who has every convenience at his command—to say nothing of his invisible assistant, who by his touching powers, directed not to the feelings, but to the features, succeeds in producing a result which he is pleased afterwards to call first-class photography. But under the canopy of the sky, in that vast operating-room, all are on the same footing; it is therefore incumbent on the amateur to strive to equal the best operators.

But what process is he to follow, when, in the various Journals devoted to photography, he reads of numerous processes, each of which is stated to produce pictures which, "for beauty and sharpness, and at the same time the most exquisite softness, surpass all others"?

I shall not attempt to give a list; suffice it to say, that they commenced with honey, and ended with gin and water.

Collodion photography may be divided into three classes:—1st, wet; 2nd, moist; and 3rd, dry. And first in every respect is the wet process, because it is applicable for every purpose, and produces the quickest and most striking results. I have almost altogether followed it, because I found that it occupied less time than the others and was more certain, which, after all, is the great thing to be desired.

What photographers desire most, are good and intense skies, foliage without the appearance of being snowed upon, water which will appear almost in motion, and perfect detail in the deepest shadows.

Most beginners think if they have an intense sky that the negative is a good one; but I have found that many a negative is spoilt by making the sky opaque; for, as a matter of course, if the sky be very intense, so are all the other high lights, and the consequence is that the picture is harsh and disagreeable.

I find the sure way to get a good negative is to give ample exposure; for if it should be over-exposed, by the use of a little nitrate of silver in the developer sufficient contrast may be obtained, and by careful attention to the printing—always bearing in mind that to print well from an over-exposed negative, the paper should be sensitized on a very strong silver bath: but nothing can be done with an under-exposed negative; for what can supply the want of detail?

Much can be effected by the judicious use of developing solutions, according to the light, and nature of the subject. Out-of-door photographers should be supplied with the ordinary pyrogallic and sulphate of iron developers; the latter is particularly useful in cold weather; indeed, at present many photographers use it altogether; but as a general developer I prefer pyrogallic acid, as it gives more brilliant negatives. An iron developer has a tendency to fog the shadows; and it requires a large proportion of acetic acid to keep them clear, particularly in warm weather, or when using a collodion recently iodized.

I think that running water, when its course

is uniform, can be best obtained by giving a long exposure. I tried the experiment a few days ago; the subject was the lower part of the Powerscourt Waterfall, which is, as most of you are aware, a mass of foam rushing over dark rocks. I gave, with a very sensitive collodion, 4 minutes' exposure. I used also the largest aperture ($\frac{3}{4}$-inch) with a Ross landscape lens of about 13 inches focus. A print from the negative is here for your inspection.

When photographing a subject which requires a long exposure to bring out the details, I prefer shutting out the sky altogether, or so arranging the view that it is only seen through the interstices of the branches of trees; for I have found that the sky is never burnt out when allowed to fall on small detached portions of the plate. I have on a former occasion shown my developing box which I use for stereoscopic pictures, and in which I can take 9x7 pictures without using a camera. The box is 18 inches long by 12½ wide and 13 inches high. As I have made some improvements in it, I thought it well to bring it before you again. In this I work with great ease; and if I find any difficulties at times, it is from the spectators, and not from the apparatus.

It is in towns that the open-air photographer has his patience tried. I find it the best plan to answer all questions; indeed on one occasion I gave a short lecture, of a very elementary nature certainly; but the thing was a decided hit, and I was pronounced to be the cleverest gentleman that ever visited that part of the country by my discriminating but unwashed audience.

But highly as I estimate the wet process, I cannot but allow that the dry ones have some advantages: there are often days in hot weather when a person has not the energy to work—for work it is; or if *en route* through a country, when time did not allow him to delay, if then provided with some dry plates and a convenient camera, he might bring home views which he otherwise would never have obtained. Besides, a dry process is decidedly the one for interiors, and the readiest mode for printing stereoscopic transparencies.

Although very good pictures can be taken by the moist processes, such as the honey, oxymel, &c., I do not recommend them, for the following reasons:—1st, they are uncertain, being very apt to decompose, particularly in warm weather; 2nd, they are very dirty; and, lastly, they are not suited for printing transparencies, as plates prepared by them would stick to the negatives if pressed against them.

Of the dry processes, the following are the most in use:—Taupenot's Collodio-Albumen, Fothergill's, and the Metagelatine. I am at present engaged in experimenting on the dry processes, and I hoped to have had some specimens to show you this evening; but I am unable to do so until a future occasion, as my experiments at present are far from being conclusive. However, of the testimony given by others, the preponderance of evidence is very much in favour of Taupenot's process.

The only paper-process which I have worked is the wax-paper process; and if a person does not require very brilliant or sharp pictures, it is very certain, but is not adapted to every sort of subject, as the high lights are apt to become very intense.

Wax-paper negatives do not yield such brilliant positives as glass—for this reason, that in the former the deep shadows have to be printed through paper, which, although rendered transparent by the waxing, is still far from being so clear as glass.

The slowness of wax-paper prevents it from being so sharp as a quick process—as, supposing the picture to be exposed in sunshine, the shadows are constantly changing their edge. Accurately note the change of shadows in half an hour, which is the average exposure for a wax-paper negative, and it will best explain why wax-paper does not give results as sharp as a quick process. Of course these remarks equally apply to all slow processes taken in sunshine.

But for travelling, wax-paper has many advantages, particularly for large pictures; for any quantity of negatives may be carried in a portfolio, whereas the bulk and weight of glass is something alarming, and by judiciously selecting the subject and light, very beautiful pictures may be obtained.

The photographer having now selected his process, and provided himself with apparatus according to his fancy, goes forth in search of the picturesque. Perhaps he has a day or two at his command, and he proceeds to some celebrated locality, of which he has no previous knowledge; and I cannot fancy any one being placed in a more distressing position—I speak from experience—than a photographer, whose time is limited, suddenly finding himself in a country abounding with photographic subjects—rocks, wood, and water, with a respectable ruin or two to make the thing complete. He runs to and fro with his camera, takes one picture here and another there; but, just as the light has failed, he discovers one or two views which by far exceed all the others, and he then retires from the scene a sadder but a wiser man.

But he may have tried to supply his want of information by the purchase of an *artistic* print of the locality. However, on comparing it with

the actual scene, he discovers it to be "a mockery, a delusion, and a snare," and that the artist must have been possessed with eyes that could see round a corner.

I would therefore recommend that the photographer should first carefully study his subject, unaccompanied by his camera, and that he should place but little dependence on any views, unless taken with the camera.

Photography has that great advantage over all other representations, namely, that it must tell the truth. Who, then, will take any man's view of a place, when he can procure its image printed by light?

In the selection of subjects for the camera, I prefer those that are near, as it is the wonderful detail that is so striking in the photographic picture; but distant views become so minute and like a map, that a considerable portion of their effect is lost, except when taken for the stereoscope.

In conclusion, it is almost unnecessary for me to remark on the rapid strides the photographic art is continually taking, and of its increasing applicability: it has been welcomed into every dwelling, from the palace to the cottage; and its votaries have the consolation of feeling that theirs is not a selfish pleasure, but that it is a source of enjoyment to others.

Photography has been called a "black and white" art, but black and white can produce great results. Printing is a black and white art, and no one will question its power; and that man indeed is to be pitied, who, having before him a truthful picture of some scene, perhaps of one endeared to him by the memories of the past, is unable to invest it with the many colours which the imagination is at all times capable of affording.

Mr. Vickers, the Honorary Secretary, exhibited a stereoscopic camera, with rack and pinion movement, having twin lenses of Mr. Grubb's patent form; and means of adapting lenses of four-inch or three-and-three-quarter-inch focus to it; and also an apparatus for uncovering and covering the lenses, so as to give either an instantaneous or lengthened exposure, as may be desired.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith. The same proviso extends to communications to the Editor.

Copying Paintings.

To the Editor of the Photographic Journal.

Bruges, April 29, 1859.

SIR,—The letter of "H." in your Journal of March 5, respecting the copying of pictures, may probably have received the answer it requires (I have not seen the last two Numbers of the Journal). If, however, it has not done so, and as I have lately had an opportunity of obtaining the information he asks from two very successful operators in this branch of our art, it may be of use to impart the same to "H." or others who are wishing to follow out the same occupation.

"H." will find, in the last edition of the 'Chimie Photographique' of MM. Barreswil and Davanne, the formula employed by M. Fierlandt, who uses for this purpose a tolerably thick and highly salted collodion, in which the bromide plays a principal part in some cases, and in others is used with iodide in the proportion of iodide 1 pint, bromide 2 pints. I learned from that gentleman that he varies the proportions with nearly every picture copied, as the colours may require; and it is evident that as a brilliantly coloured picture and a sombre one, or one dulled by age, will each require a different treatment, it is in this portion of the process that the skill and judgment of the artist must stand instead of fixed proportions.

A lens constructed for this purpose is of course desirable; and if the reproductions are to be large, it is evident that a long focus is necessitated, and a long exposure equally required, which, if any dry process is used, must be still further prolonged.

For this reason M. Fierlandt uses a bath of nitrate of silver charged with sugar, which retains the moisture on the surface during the time necessary, which is rarely less than a quarter of an hour.

The pictures, to be successfully copied, must be removed to the open air, and be covered with a canvas overhead to avoid reflected light from the sky to the surface; and if necessary to avoid side reflexions, a dull-coloured curtain may be hung on the side required.

The best lighted galleries have rarely enough light for successful copying of hung pictures without a very prolonged exposure, and in that case it would probably be better to preserve the plate with oxymel.

The gentleman I have before named has had

great experience in the Taupenot process, but he has quite abandoned it for this purpose.

The development is effected by first using a weak solution of pyrogallic acid, which is replaced, when the details are well out, by a stronger solution till the required depth is obtained; and in some cases by commencing with sulphate of iron and continuing with pyrogallic, if the sulphate does not give sufficient intensity alone.

I have used M. Fierlandt's name without his sanction; but I feel sure he will not object to my having imparted the information he so kindly gave me, and which he has to a great extent before permitted to be made public.

Without wishing to discourage "H." in his hopes of obtaining copies of pictures in the Continental Collections, it is only fair to warn him of the difficulties he is likely to encounter. Admission to private collections is generally most freely granted, and the churches and museums are open to all, but he will find it difficult to obtain permission to copy their contents. In the churches it is next to impossible to get a picture unhung, and in no case can it be done without the consent of the Marguilliers and Curé; and in the museums permission can only be obtained from the Commission which is appointed to watch over the collection; and all these difficulties will be increased by his being a foreigner and, perhaps, a Protestant.

EGBERT MOXHAM.

Photography and Art.

To the Editor of the Photographic Journal.

SIR,—That Photography can be made a medium for the presentation of perfect Art, in its most poetic as well as in its lower forms, is, I think, now beginning to be felt even by the most strenuous opponents to art as exhibited in photography. Critics have admitted its capabilities as a copyist for many years; they are now beginning to admit that photographers can think with their cameras as well as painters can with their brushes, or sculptors with their chisels. The brush or chisel is as much a machine as the camera, and not more capable of being compelled to produce the thoughts of the directing mind; indeed the mind of the artist, whether photographer or painter, is so visible in his works, that judges can as easily name pictures by followers of the one branch of art as the other. In our last Exhibition there was as much good art, in proportion to the number of pictures exhibited, as ever appeared on the walls of the Royal Academy: there were of course some very inferior specimens; but that only proves that the camera is not a machine to be employed alike by all; it proves that great talent, if not absolute genius, is required to produce a good photograph, and that our art is one in which it is only permitted to a few to attain the highest eminence.

Photographers having arrived at this state of perfection, and having proved that it is possible for a superior mind to produce a superior photograph, the time is now come when we might confer honours on those who have attained the greatest skill, as painters, sculptors, and architects have honours conferred on them by their election to the Royal Academy, and scientific men to the Royal and other Societies; and my object in writing is to suggest that the Society adopt some means of conferring like honours on their most distinguished members. At present any person might become a member of the Society on payment of the usual subscription, without any proof being required that he is a photographer at all; it is therefore clearly no merit to become a member of the Photographic, as it is of many other learned Societies whose members can only be elected for their abilities.

There would be no difficulty in creating a branch of the Society, the members of which should be so limited as to make their admission an honourable distinction; and they should be elected by the general vote of the Society. This would be a proper reward to those who have done so much for the advancement of the art, and would stimulate the members to still further exertions. The artistic members could be chosen from the contributors to the last exhibition before the election, and the scientific members from those who have contributed valuable knowledge to the Journal.

Leaving the further consideration of the matter to those who are better able to carry it out, I am, Sir,

A MEMBER.

On some of the Applications to which Photography has been applied.

THE recent and sudden call from the scene of his valuable labours of one who energetically promoted one of these applications seems to call for a statement of the modes he employed to effect this one among the many results of his life. Manuel Johnson, but yesterday the Radcliffe Observer at Oxford, established at that observatory, which he raised to so high a place among the observatories of the world, a complete series of meteorological records. These records were continuous and automaton. Clockwork kept a sheet of paper constantly moving behind each meteorological instrument, and as it moved, a lamp threw on it a column of light.

The length of that column constantly changed; and an inspection of the instrument would show that that change was really caused by the variation of length, it may be in the mercurial column of the barometer or of the thermometer, or it might arise from a change in the humidity in the air, in the direction of the ever-vacillating gusts of the wind, or in the wind's force. Thus there were constantly, day and night, a series of long slips of paper on which these shadows were thrown, and which, silently, surely, and with no visible change on the paper itself, passed regularly on, each succeeding part of the paper receiving that image as it varied with the successive moments of time. But that fleeting shadow had left its impress there; for the paper was photographically prepared, and needed only development to yield a permanent and infallible record of the changes in the particular atmospheric movement which it was destined to perpetuate.

This method had been applied at Kew. It had been employed with most admirable results for measuring the constant fluctuations in the force and direction of the magnetic needle, and inversely, therefore, in the magnetism of the earth, at Greenwich, and at several of the magnetic observatories of the world; and Manuel Johnson carried it to a perfection, as a means of recording all the various meteorological changes, that no one else had done before. Science has a right to expect that his useful work may be carried on in the future at Oxford, and will always associate the results with the memory of one who was not less loved than he was respected by his scientific compeers. Astronomy has also tried to avail itself of the photographic agency of light. Mr. De la Rue's beautiful photographs of the moon, on a scale never dreamt of till he produced them, proclaim what may be hoped to be effected with such an instrument as Lord Rosse's. But they have also told some unexpected tales of the nature of the moon's surface, by showing that some parts of that surface absorb the photographic rays in a much larger degree than others; and the contrast between the great lava-coulées, if such they be, that radiate so far and wide from the mighty base of Tycho, as compared with the other parts of the surface, gives to these photographs a force and a brilliancy quite startling to the observer who knows them only through the telescope. Nor are the minute specks less interesting which Mr. De la Rue's home-made and admirable reflecting telescope has produced for him when turned on the planets. One looks on a collodion-coated plate of glass; and one sees nothing, or perhaps only a speck of seeming dust. Yet a lens of some power reveals in that tiny speck the orb of a planet—a Jupiter with his belts strongly marked, or a Saturn, and,

"as he whirls, his steadfast shade
Sleeps on his luminous ring."

Here, too, new contrasts, produced by unexpected differences in the absorption of light by different parts of the planets, are exhibited; and here, as in the lunar orb, one is tempted to ask the question, How far will the science of another age be in a position to form some bold surmise as to the lithological or other material of these various parts of planets and satellites, by an increased knowledge of the various powers of absorption exercised on the different solar rays by the various materials composing our own globe, the sister to those orbs in space?

Other interesting facts, and needing further experiment for their explanation, have also been exhibited by these astronomical photographs, relating especially to the diminution of the photographic action of the lunar and solar surfaces as the angle of the ray is more oblique.

The microscope, too, has a part to play as an instrument for the photographist, and undoubtedly much here also has to be revealed by the invisible chemical rays which the eye may see but imperfectly; while the results produced by microscopic photography will place within reach of those whose time, whose purses, or whose eyes are unequal to the undertaking of microscopic studies, results which can be obtained otherwise only by so large a devotion of time, means, and eyesight.

On the relations of photography to art there is room for much discussion, and probably also for controversy. Photography has driven into the limbo of the unemployed a class of miniature-portrait painters, and they, like the ostlers and innkeepers of the old "roads," who occasionally revenged themselves upon the railways by becoming *employés* upon them, have in many instances joined the motley ranks of photography itself. But that the true artist will not throw down his brush and retreat before the advance of photography into his domain, is evident enough. The utter powerlessness of the chemical pencil of the sun to give the true relations of intensity of colour, the absence from the photograph of that ideal element which is the soul of art, leaves the relation of the photograph to the picture at best only as that of a useful auxiliary to a great result. Even were it possible for the photographist to surmount the former of these difficulties, and to depict not only in correct relative intensity of light and shade but even in actual colour the truth of nature, of which at present there is not the faintest hope, must not the photograph still stand towards the artist's great

work as the truest prose description to the imagery of the poem?

The artist need not fear the encroachment of the photographist. He may take the results of the camera,—he has already done so,—and by careful scrutiny of nature thus depicted on a flat surface in such marvellous detail, he may learn a new reverence for that patient elaboration of particulars which need not mar his whole; and he may thereby feel that if he never can attain he can yet approach that infinite delicacy of finish which marks the photograph, and that in that approach he is being truer even to the poetry of art than if he were to live in that scorn of detail and emulation of "broad effect" alone, which was born of the consciousness of the limit placed to human action in the production of minutiæ, but has never characterized any really great school of art in any age. M. Le Gray may startle by the instantaneous production of a sea-piece, crisped with laughing waves, fringed with the froth and foam of breakers, and overhung with skies of magical reality. But these pictures only startle: the artist feels all their want of true soft harmony, in fact their want of truth; and the public express the same consciousness of their false contrasts by asking if they are indeed moonlight views, or if the heavy clouds are really thunder-clouds. M. Baldus and the Bissons have it all their own way in their colossal views of the new Louvre and the new Tuileries, or of other vast buildings in Paris and elsewhere. But what artist would select such huge masses of masonry alone for the subjects of a picture? To convert them into a picture, he must make them into the background of some living scene, with humanity stamped upon it; or must throw around them the garb of beauty—some tinted gauzy atmosphere won from a setting sun, caught in those transient moments when nature is, as it were, her own poet; or rather when the exuberance of her beauties can overflow and deck in a foreign grace scenes not else beautiful, and so make even such to appeal to the seat of poetic and artistic sympathy, the human heart. De la Motte, and Fenton, and Bedford, and a few others, may strive, and may now and then succeed in catching some happy effect in their camera; but it is where the camera is pointed to some expressly lovely scene at some happy moment; and is it not also due in no small degree—in fact entirely, in so far as such a result is not accidental—to the artistic feeling in the mind of the photographist himself, who knows how to choose and when to take his view? But in fragments of foreground, in those small bits of detail in which the artist has to subordinate his genius to mechanical and patient labour, the photographist is his best colleague; and it is in the careful study of such photographs that he will feel that art has nothing to fear, but much to learn, from her mechanical (?) associate, photography.

The invention of the stereoscope has given a remarkable stimulus to photography. Without photography the stereoscope would have been but a curious apparatus confined to the lecture-room or the drawer of philosophic toys; with photography it has become an article of furniture in every household.

The two images, separately seen by the two eyes, but united into one in the region where optical phenomena pass into the perceptions of the sense, must needs be different. The stereoscope represents such two images, and by an ingenious contrivance brings each before that eye that might have seen it in nature. But when the stereoscope ceases to represent the two pictures as seen from the two points of view represented by the situation of two human eyes, it ceases to be a true representation of the object to a human mind. A stereoscopic picture of Paris, taken from two points of view, each of which is situate on a different tower of Notre Dame, may represent the aspect of a human city as it might be seen by some "vocal Memnon" if he were gifted with eyes: but to him it would seem a toy city; and to human eyes, when thus ingeniously severed from one another by some sixty feet, such a scene must look like a cardboard model; for the several distances and the parallax of every point are entirely displaced from their true positions as seen by any two eyes that could look out from any human head. There is therefore always something startling and always something disappointing in such stereoscopic views. The true effects of the stereoscope are those of more modest pretensions; and it is where the angle is correctly taken, and the stereoscopic influence confined to a foreground and to near objects, that the spell of a solid reality investing the objects looked at is complete, and this pretty philosophic toy becomes the instrument of a beautiful illusion, and possesses a charm of that rare kind that may truly be called a new one.—*From the "National Review."*

Improved Collodion-bottle.

To the Editor of the Photographic Journal.

Crockham Hill, near Edenbridge, Kent,
March 1859.

Sir,—It has occurred to me that there is room for improvement in collodion bottles, to prevent the sediment flowing on the plate. I enclose a sketch of an idea of my own, taken

from a common ink-bottle. The sediment may very easily be removed from it by means of a

glass siphon fitted in a cork, and a piece of tube through which to press air, on the same principle as Mr. Hardwich recommends for pouring off clear collodion.

If you think this hint worth inserting in the Journal, I beg you will do so.

G. P. M.

Transfer Liquid.

To the Editor of the Photographic Journal.

Tilshead Vicarage.

SIR,—I have not seen a description of an easy method of transferring a positive collodion picture to leather or leather-cloth in the Journal; and, as it may be acceptable to some of your readers, I venture to send you the following directions.

Take 1 oz. rectified spirits of wine, 15 minims of nitric acid.

Develope in the usual way, but do not varnish. When the collodion is quite dry—but on no account before—pour on the above liquid and drain for a few seconds. Place the plate upon a table, collodion-side upwards, and then gently cover the picture with the cloth cut to the requisite size. With an ordinary round ruler, covered with a piece of india-rubber tube, rule the cloth down with moderate pressure for two or three minutes. This done, reverse the position of the plate, and put a small weight upon it. In an hour or two the varnish will dry, when the cloth must be gently removed, together with the picture. It may be afterwards mounted upon a card with "liquid glue."

Photographs so taken can be sent by post without injury.

A question, however, has occurred to me—As you use so much nitric acid, will the pictures be permanent? To this I can give no satisfactory answer. I shall be glad if any of your readers are able to do so.

By way of experiment, I put a picture treated as above into water, along with a slip of litmus-paper, and fully expected the usual change of colour. To my surprise, after soaking twenty-four hours, the test-paper gave no indication of acid whatever. What became of it?

J. H. JOHNSON.

ANSWERS TO CORRESPONDENTS.

Capt. Allan Scott, of the Madras Artillery, has sent us some most interesting stereoscopic views, taken in the Deccan; consisting, amongst others, of—"Tomb of Abdoolah Shah, and other Tombs at Golconda;" "The Ferocious Dooley;" "Residency, Hyderabad;" "Banian Tree;" "A Peepul Tree;" "The Ficus religiosa, and other trees;" "Portraits of Salar Jung, and other Eastern Celebrities;" "View in the Summer Residence of Nawaub-shumsh-ool-omra in the Deccan."—He says, "I have about 200 negatives of most interesting subjects; they were taken with Bolton's collodion, and developed according to the suggestions of Mr. Barnes in the 'Photographic Journal,' p. 218, 1858." Capt. Scott also says, "I hope you will do me the kindness to offer to exchange with any member of the Society for similar numbers of their pictures, so that I may see what progress photography is making in England." Not only as an early member of our Society, and as one who has rendered good service to photography, but as an old friend, we shall be most pleased if any of our readers will send us any of their productions, and we will guarantee, as speedily as possible, that they shall in return receive an equivalent.

Major Gill (*India*).—A negative may be taken from a glass positive, but it is seldom done so satisfactorily as from nature. You will do wisely at once to discontinue the practice of taking only positives on glass. Glass positives are very liable to injury; and should an unfortunate accident occur, from possessing no duplicates your disappointment will be great.

W. Ireland.—"How is it that on a plate prepared by the raspberry-syrup process, *exactly according to directions given*, whatever negative collodion I may use, the film INVARIABLY breaks? (I am *very* careful in my manipulation *throughout*.)"

Few have been successful with this process in England; but we have seen some admirable specimens produced by the Rev. Mr. Sisson, who first communicated it. It has been said that the Raspberry Syrup as prepared on the Continent differs much from what is sold in this country.

A. L. (*Dublin*).—The specimen of glass sent through the post, and much smashed, is quite unfit for a glass house. If you will sensitize a piece of paper, and put it into your printing frame, you will soon see how much the light is obstructed by passing through this glass.

Letters of inquiry to the Editor can only be answered through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 85. MAY 23, 1859.

In our Number for October last, it was announced that it had been determined by the Council of the Photographic Society that this Journal should appear twice a month during the period of the Meetings of the Societies; and in accordance with that resolution seven additional Numbers have been issued.

The attention of the Council has been called to the fact that the old day of publication, the 21st, is considered a very inconvenient period for the issue of any serial; and therefore our future Numbers will be published regularly on the 15th of each month, commencing on the 15th of June next.

In the rear and on the outskirts of every army there lurk a lawless band of rogues and vagabonds, to whom a victory achieved represents only an opportunity for pillage and murder. Such human vultures, who only wage war that they may snatch the wages of iniquity, and who bring disgrace on better men by their foul misuse of the arms they bear, infest other armies than those that do battle by the sword. The ranks of literature, the army of science, the noble brotherhood of art, have all such camp-followers,—debased in mind, foul and iniquitous in purpose and object, yet ever watching to turn to their own vile ends the triumphs achieved by good men and true.

We are reluctantly compelled to believe, and consider it our duty to mention the fact, that at this present time there are a number of men so foul-minded and degraded as to employ the science of photography in producing stereoscopic slides of the filthiest and most pruriently indecent kind. A semi-nude woman with a beastly leer on her sodden face, a wretched ballet-girl with clothing indecently stunted, and objects of a still more objectionable kind, all utterly devoid of artistic taste, are exposed in the windows of even respectable shops as the proper sort of aliment wherewith to feed the public taste for art; such are the productions that these miserable panders to the under-current of vice that lurks in every man's mind, offer as a substitute for

> "the pleasures
> That fancy can beget in youthful minds."

Can it be wondered at, that in many decent households the stereoscope is looked on as an objectionable instrument, when there is a chance that the search for new and interesting slides may disclose to the customer (perchance a young girl or boy) such filthy objects as those alluded to. It is surely time that some stringent measures should be taken to punish the men who make a traffic of such things. The purpose of all art is to elevate the taste, and to refine instead of degrading "the unpolluted temple of the mind." Here, then, is a definite line by which to distinguish the beautiful renderings of classic statuary from infamous productions that cast a slur on the photographic art. And as to any bombast concerning the freedom of art, we opine that the class of men who might protest against the interference we suggest as needful would be little likely to gain much sympathy, whether producers or buyers of these obnoxious slides. That those who produce such things are the veriest foul scum which ever disgraced the name of humanity and degraded the name of art, we need no other evidence than their own works to prove. And the purchasers of these filthy slides are, if

possible, still more despicable, miserable vitiated creatures, whose youth is old in vice, who think they are witty when they are only blasphemous, and funny when they are only obscene; horrible old satyrs, who having lived fast lives, go fast to their graves, and learn too late that vice is the most exacting of usurers;—these form for the most part the purchasers of such commodities, who make the trade worth pursuing. To one of these classes may be referred every buyer of these filthy slides; and this the sellers of them well know. As regards the wretched creatures represented, who must know that the same faithful art which records their disgrace will also perpetuate their likenesses with the brand of infamy on the brow, it may well be wondered who these can be. We are unwilling to believe that any woman can be so lost in hope of a future, when such portraiture may prove to her a shame, as to so degrade herself by her own free will, and can only suppose that these miserable women are the wives and sisters of the photographers themselves, dragged down by their vile companionship into such low depths of shamelessness.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

Ordinary Meeting.

May 10, 1859.

W. Scott Elliot, Esq., in the Chair.

The minutes of the preceding Meeting were read and approved.

The following gentlemen were balloted for and elected ordinary Members of the Society:—Capt. Johnstone Stewart, Mr. R. E. Curwen.

Prof. George Wilson read a paper "On certain Actinic Phænomena connected with Photography."

On Dryness, Darkness, and Coldness as means of preserving Photographs from Fading.

By Prof. George Wilson.

I need not tell the Artist-members of the Society, that too often the beautiful pictures produced by light turn out dissolving views; nor that it is still a vexed question whether any photograph can be considered as permanent in the sense that an engraving or piece of letter-press printing is.

That this question will yet be answered fully in the affirmative, I entertain no doubt. My present object is to contribute in *one* direction to the solution of this important problem, by showing the Society the result of certain experiments which have been in progress, some for eight, others for twelve years.

The object of these trials was not to solve any question in photography, but to throw light on the theory of bleaching, and on a problem in chemical science. The results, as affecting the two latter points, did not imply the prolongation of the experiment over a very lengthened period, and were successively published in 1848* and in 1850†. The specimens, however, were preserved, and I now show them to the Society as illustrations of the important part which *moisture* and *light* play in inducing and accelerating chemical change; and conversely, the value of *dryness* and *darkness* in arresting or postponing chemical change.

It will be convenient to treat the subject deductively, and to begin with *moisture*. Chlorine gas is known to bleach vegetable and animal colouring matters almost instantaneously. It does so, however, only when accompanied by moisture. After many failures, I found it possible to dry this gas, as well as coloured papers, so perfectly that a stream of desiccated chlorine might be sent for five minutes over desiccated paper without sensibly bleaching it, whilst, if moisture were present, bleaching occurred in a second. Moreover, when dry litmus-paper was shut up in a sealed glass tube containing dry chlorine, after five minutes' exposure to a current of the gas, and the tube was put aside in a shut cupboard for eight months and a half, no bleaching occurred. This experiment was commenced in July 1847, and I now show the Society the tube in May 1859, nearly twelve years having elapsed since blue and red litmus-paper were shut up in chlorine. Even now, although free chlorine can be seen in the tube, the papers retain, though not completely, their colour. Here, then, by excluding water, the most energetic bleacher known has been rendered powerless, or nearly so, for about twelve years.

At the same time, and in exactly similar circumstances, a second tube containing dry chlorine was treated as the first had been up to the sealing of the tube. Thereafter, however, instead of being shut up in a cupboard, it was hung up at a western window and freely exposed to the light.

Here it remained from July 30, 1847, to September 17th of the same year, during which it was not visited or seen by any one. At the end of that period it was found, as I now show it to the Society, with the colour totally gone, the paper appearing perfectly white. How short a period had sufficed for this actinic bleaching I had no means of judging: but

* Transactions of the Roy. Soc. Edin., 1848, "On the Action of the Dry Gases on Colouring Matters."

† Brit. Assoc. Rep. for 1850.

less than six weeks of sunlight have been sufficient to develope the bleaching power of chlorine; whilst, *cæteris paribus*, this power has remained dormant during nearly twelve years of darkness. The contrast between the two tubes would doubtless have been still more striking, had the first been preserved unintermittingly in darkness. It has often, however, been taken out of its receptacle, which was only in partial shade, and exposed to indirect light for hours together. This has occurred once at least every year since the experiment was commenced, and sometimes more frequently. In this way actinic action has been free to occur, and to this I attribute the partial bleaching that has happened. As it is, however, the result is sufficiently striking. Wet chlorine bleaches in a second; dry actinized chlorine bleaches in four or six weeks; dry unactinized does not bleach fully in twelve years.

I have not always found actinic-chlorine bleaching proceed so rapidly. The apparently fragile colouring matters of some plants, such as that in the petals of the common wallflower, have resisted for months the bleaching action of actinized dry chlorine. This fact still further illustrates the effect of dryness in arresting actinic action, and how much we always gain, in the way of preventing chemical change, by withdrawing moisture. All the facts mentioned, moreover, have a direct bearing on the wet and dry collodion processes and other photographic devices; for the habitudes of the other chemicals used by the photographer are similar to those of chlorine, especially in the case of such as are analogous; and though the dryness of dry collodion, *ex.gr.*, is very far from absolute, still it is sufficient to make a material difference between the rate of chemical change in the wet and dry processes.

I made a similar series of experiments with the acid gases, namely carbonic acid, sulphurous acid, sulphuretted hydrogen, and hydrochloric acid, so far as moisture is concerned. The whole of the gases in question were found to lose their power to redden vegetable blues, and change to yellow vegetable browns by deprivation of moisture. Even hydrochloric acid, the typical acid of modern chemistry—the acid, as it were, *par excellence*, could, though only with great labour, be robbed by perfect desiccation of all power to redden blues, even when driven over them in a rapid stream for five minutes.

When, however, the dry acid was shut up with dry blue litmus-paper, the latter slowly began to become purple, then red, and finally perfectly black from charring, as the specimens sealed eleven years ago, which I show the Society, will amply illustrate. This ultimate result was doubtless due, as I have shown elsewhere, to the extraction of the elements of water from the coloured paper, and the combination of the hydrochloric acid with these, leaving the characteristic carbonaceous substance which remains when paper (consisting, as it does, of water and charcoal) is largely deprived of the former.

The much less energetic acid gases, carbonic acid, sulphurous acid, and sulphuretted hydrogen, were easily deprived of moisture, and in the lapse of a year had not markedly—I may say, had not sensibly—acted on the colours exposed to them. And even now (as the tubes sealed in April 1848, which I show to the Society, will illustrate), eleven years of contiguity, unaccompanied by exposure to full sunlight, but not spent in utter darkness, have not enabled one of these gases to make more than the feeblest impression on the sharer of its long captivity.

In the summer of 1850, in anticipation of the Meeting of the British Association in Edinburgh, I made a series of experiments on the compound gases I have named, with special reference to the power of light, in the absence of moisture, to exalt their chemical action on organic coloured bodies.

Hydrochloric acid, for reasons which will be apparent to all, was excluded from trial. The gases actually employed were carbonic acid, sulphurous acid, a mixture of both acids, and sulphuretted hydrogen. I took the opportunity also of repeating some of the experiments on chlorine.

In these experiments the tubes which I show the Society had each within it a slender glass spike or wire occupying its length, on which were impaled squares of coloured paper of various tints. After thorough desiccation of these papers, and transmission over them of the desiccated gases, the tubes were hermetically sealed whilst full of gas, and thereafter hung up for about three months (namely, during May, June, and July, 1850) in the open air facing the south.

With the exception of the chlorine tubes, sunlight or actinic influence fought in vain against the absence of moisture. The ancient axiom, "Corpora non agunt nisi soluta," proved true; and even now, after the lapse of nine years, there is not a single tube which shows fully the characteristic action of the compound gas which it contains. After their three months' insolation they were put aside,—neither consigned to darkness nor exposed to meridian sunshine, but treated very much as drawings in a portfolio are, occasionally handled in open day, more frequently left in the

shade. I find on looking at them today, that the sulphurous acid and the sulphuretted hydrogen have in the end exerted a sensible, but feeble action, as the specimens before you illustrate. Carbonic acid is far less marked in its influence, but is not altogether powerless, as the tube I show you filled with that gas eleven years ago will demonstrate. There is no reddening of the paper; but there is a visible amount of bleaching, which I cannot refuse to set down to the action of the gas.

The gases which I have named are those which, as present in town atmospheres, prove most injurious to all objects within their range liable to suffer from the action of acids. The experiments, however, were not made with any view to test atmospheric influences; and the legitimate conclusions which they justify are therefore all the more trustworthy.

I need not urge that if the prejudicial gases of the atmosphere—those, namely, which are prematurely crumbling our Houses of Parliament, corroding our telegraph wires, destroying our libraries, tarnishing our jewels, wasting our textile tissues of all kinds, and sapping our individual health, besides spoiling our photographs—can be rendered innocuous, or nearly so, even in their most concentrated condition, by drying them, the exclusion of moisture from photographs will certainly greatly conduce to their preservation from change under less trying dry atmospheres.

I would suggest accordingly, that photographs, whether on paper, glass, metal, or other material, should, before framing, be rendered thoroughly dry, and should thereafter be enclosed in air-tight frames. Starch, gum, paste, glue, gelatine, and the like hygroscopic substances liable to mould, ferment, or decay, are much less suitable for mounting photographs or cementing together surfaces and edges, than the much less alterable resins and other solid hydrocarbons soluble in alcohol, turpentine, naphtha, and analogous non-aqueous liquids. Many of the varnishes at present employed by the photographer for other purposes would usefully replace the paste used for mounting paper positives, and would be little more costly. In the case of valuable photographs, the difference in price would certainly not be worth consideration. An additional guarantee against change would be furnished by the exclusion of air, or rather by the substitution of the highly indifferent nitrogen for it.

So far, again, as negatives are concerned, they could probably be most conveniently preserved from change in an air-tight opaque box or chamber with a false or perforated bottom, containing in the space between the grating and the true bottom a drying or desiccating agent, such as fragments of fused chloride of calcium, fused carbonate of potash, pumice-stone soaked in oil of vitriol, or even unslaked lime. The box, of course, should have a close-fitting lid or cover, giving access to the interior when particular negatives require to be withdrawn and the desiccators need renewal.

My experiments did not include any direct observations on the influence of heat in promoting chemical change; but those made in the summer of 1850 implied exposure of the sealed tubes and their contents to sun-heat as well as to sun-light. The acceleration of chemical change by heat is familiar to all. As a fresh illustration of the fact, I may call the attention of the Society to a well-known process in calico-printing called "*aging*," which consists in exposing to the air cottons charged with salts of iron or alumina, till these are chemically altered and combined with the textile tissue. The *aging* has hitherto occupied a week or thereabouts; but Mr. Walter Crum, of Glasgow, who is as remarkable for his knowledge of chemical science as for his ingenuity and success in applying it to practice, recently showed me the process of *aging* completed in *one* day. This striking acceleration of chemical change is brought about simply by substituting *hot moist* air for that which was cold and dry. Conversely, coldness adds to dryness and darkness an additional element of conservation. Valuable photographs therefore should not be suspended against heated chimneys or hot-air flues, neither should they be exposed to the full blaze of the sun. Negatives should be preserved in rooms at a low temperature.

There is nothing novel, it will be observed, in these recommendations, which only the solicitation of your able Secretary has induced me to bring before you. The only novelty is in the text from which they are now urged. That heat, light, and moisture are great promoters of chemical change has been known from the earliest times. I only claim to have shown, by experiments spread over many years, that by the exclusion of all three, fragile paper and colouring matters can be preserved from destruction in circumstances more perilous than photographs will encounter if similarly defended in a limited atmosphere of air or nitrogen. We may hope therefore to save our sun-pictures from fading.

Mr. Tunny felt sure that the Meeting would agree with him, that the paper just read was of the very highest importance to photographers. The influence of moisture in causing photographs to fade was very decided. While he had not the least fear of the fate of any photographs supplied by him to those residing in town, he confessed it was with fear of the result that he inquired after the permanence of those he supplied

to people in the country, on account of the greater dampness of the walls of country-houses, which in some cases was so great that a badly-fixed photograph would, in such a situation, begin to fade in a few weeks. He then detailed some experiments corroborative of this.

Mr. J. T. Taylor referred to the subject of moisture affecting the keeping qualities of excited chlorinated papers for positive printing, stating that circumstances often prevented the amateur from printing until weeks had elapsed after sensitizing, when of course the paper had much deteriorated. On the supposition that moisture was the cause of such deterioration, he asked if Prof. Wilson could suggest any other or better way of making these papers *keep* than the one recently introduced by the French, viz. enclosing them in a dry air-tight box along with fused chloride of calcium, or other substance possessing equal affinity for moisture.

Prof. Wilson said, that although he had not particularly studied this branch of the subject, he had no doubt a case of this kind, with chloride of calcium present, would very much prolong the time of keeping of sensitive papers.

On the motion of Sheriff Cay, a vote of thanks was given to Prof. Wilson for his communication.

The Hon. Secretary read a paper by Mr. Thomas Rodger, "On a useful application of Glycerine in the Collodion Process."

A discussion followed on the subject of the paper, and the thanks of the Meeting were given to Mr. Rodger.

On a Useful Application of Glycerine in the Collodion Process. By Mr. Thomas Rodger, of St. Andrews.

[Read May 10, 1859.]

I have much pleasure in adding to the stock of practical knowledge in our art a few remarks upon the substance Glycerine, which I find to be of much value as an application to the collodion film, after partial or entire development of the negative image, to keep it for an indefinite time in so damp a state as to be suitable for subsequent treatment.

The photographer is often placed in circumstances when it is necessary for him to economize the best part of the day in the actual taking of pictures. Or he may be supplied with a limited quantity of water (supposing him to have completed the development) for the thorough finishing of the plate. Or, what is of more consequence, he may spend valuable time and material in finishing off-hand what he has great doubts of proving only a very unsatisfactory result. Moreover he is very likely, in his anxiety to save time, to hurry the development incautiously, and so destroy, to all intents and purposes, what otherwise might have been very fine pictures.

These are a few of the ordinary everyday disadvantages of the wet-collodion process as it has commonly to be conducted. Now these, with others of a similar character, by the use of glycerine in the manner presently to be described, can be easily overcome.

Before, however, giving the short detail of how glycerine should be used for this purpose, it may be as well to say (for the benefit of those who have not followed the collodion process much) that the operations of intensifying and fixing can only be very unsatisfactorily accomplished after the plate has once been allowed to become dry; and, at the same time, that these operations will be attended with considerable risk to the safety of the film bearing the image, as very often it will burst off the glass in drying, or dry irregularly the second time.

The picture having been taken, and developed, we will suppose, with the sulphate of iron developer, it will, in nine times out of ten, require to be intensified to the pitch requisite for giving a good copy, by any one of the methods which have been often proposed.

The operation of giving intensity is, as you will easily suppose, one of importance, and requiring to be done with great caution and care. Now, by the method which I have to bring under your notice, should time or convenience not permit the immediate finishing of the picture, it will only be necessary to give the surface of the plate a slight drain, and then a coating of glycerine and water, of the same consistency as ordinary collodion, and applied in like manner; and after this coating with glycerine, the film will be found to remain in a perfect state for any kind of further treatment, even for weeks or months.

Should the operator intend to give intensity to his iron-developed picture at his leisure, by the use of pyrogallic acid and nitrate of silver, it will be necessary to keep it from getting light; and before proceeding to darken it, it will also be necessary to wash off the glycerine from the surface.

If, however, intensity is meant to be obtained by employing sulphate of iron and nitrate of silver, after the iodide of silver has been removed from the film, there will be no necessity to keep the picture from light after applying the glycerine.

Glycerine is equally efficacious in keeping the film in a thoroughly damp state *after* the picture is fixed as *before* it has been fixed. Indeed, I have found it advisable, when plenty of water was at hand, and when I wished to obtain intensity by the last-mentioned method, to fix *before* applying it, as, besides the propriety of doing so, the success or non-success of the picture is, by this method, more apparent, especially if it is a portrait.

I am confident that in landscape photo-

graphy with the wet-collodion process, and with a tent or other contrivance, the use of this substance will be found of great advantage for obviating the necessity of immediate fixing after development, or for deferring the development for a short time. Half an hour often would be of great service; and by the use of an arrangement of frames or slips for holding fresh plates, so as to avoid their being ruffled or torn, this can be easily managed.

I am quite aware of glycerine having been recommended and employed long ago for keeping the fresh plate from drying, and so losing its sensitiveness.* No great reliance, however, is to be placed upon it for this purpose;—not on account of its permitting the plate to become dry, but because it has the tendency under certain conditions to reduce spontaneously the salts of silver.

I am not aware, however, of this substance having been applied for the purposes I have described, or that the necessity for it has ever been urged for such; but I can bear testimony to the comfort and ease of mind I have received from its extensive use for more than a year past.

The want of glycerine may be supplied, though not altogether satisfactorily, by a solution of honey in water, or by solutions of the nitrates of magnesia or zinc.

At a recent meeting of this Society, a paper was communicated by Mr. Sang containing much valuable information, the result of experiments concerning varnishes and other means for protecting the negative picture from injury in transferring.

I read the article with much interest; but in respect to the employment of a solution of gum-arabic for coating the newly-taken negative, I must say that I cannot agree with him in his depreciatory remarks upon its use.

I inspected many of my negatives shortly after reading his paper, and found that several which had been simply coated with mucilage of gum-arabic two years before were in perfect preservation in all respects, although printed from repeatedly during that period. It is possible, however, that their having been kept in the upper part of a house was greatly in their favour as regards their perfect preservation.

I consider that the thorough cleansing from the fixing solutions, whether cyanide of potassium or hyposulphite of soda, has much to do with the stability of the film; for I have repeatedly observed that the film has crumbled off the glass, even though strongly varnished, when it has not happened to be thoroughly freed from all traces of those agents.

The use of mucilage of gum-arabic, or any other gum which will dry hard, affords great facility for safely ascertaining which of two or three negatives of one object is the best, without the disadvantage of covering all with a gum-resinous varnish, which cannot be readily removed from the glass so as to render it again available without risk of scratching. I find it worth my while to coat every picture with mucilage as soon as it is washed, and before it dries, and certainly to coat it afterwards with good negative varnish when that is desirable.

These remarks, both on the use and application of glycerine and gum-arabic, I hope will not only be interesting, but also useful to many who follow the wet-collodion process, and who have not previously employed these substances. I am at least fully persuaded of their advantages, and feel myself, Gentlemen, highly honoured by being permitted to bring them before your notice. The Society then adjourned till November.

* In vol. ii. of the Photographic Journal, p. 273, will be found a reference to the use of glycerine by Mr. Llewelyn. Mr. H. Pollock also conducted many experiments some years since on the utility of glycerine as a preservative agent, but we are not aware that their results were published.

Stereoscopic representation of Print as it appears when viewed with both eyes through Double-refracting Spar*. By H. W. Dove.

In the Report of the Academy, 1858, p. 315, and Pogg. 'Ann.' vol. civ. p. 329, I have stated that if a plane drawing be regarded with both eyes through a crystal of calc-spar, one image appears elevated considerably above the other, while if it be regarded with one eye, the two images appear to lie in the same plane. As the reason for the elevation in the former case is to be sought in the different refraction of the ordinary and extraordinary rays, I came to the conclusion that the phænomenon in the calc-spar would be reproduced stereoscopically if the double refraction were represented by a double impression, the different refraction of the two rays being represented by a shifting of the repeated line towards the first line. The six top lines of Slide I. that accompanies this, when regarded in the stereoscope, display this phænomenon in a striking manner; the last line relates to the following paper.

If, in a stereoscope, the drawing designed for the right eye be substituted for that for the left, and *vice versâ*, the convex relief becomes concave. It is obvious that if it be desired to render this change visible, if, for instance, in

* We are indebted to Dr. Francis for the above communication, the copyright of which is reserved.

Stereoscopic representation of
Stereoscopic representation of
letter-press viewed binocularly
letter-press viewed binocularly
through Iceland spar.
through Iceland spar.

Stereoscopic representation of

Dove.

Stereoscopic representation of
Stereoscopic representation of
letter-press viewed binocularly
letter-press viewed binocularly
through Iceland spar.
through Iceland spar.

Stereoscopic representation of

Dove.

Stereoscopic representation of
Stereoscopic representation of
letter-press viewed binocularly
letter-press viewed binocularly
through Iceland spar.
through Iceland spar.

Stereoscopic representation of

Dove.

Stereoscopic representation of
Stereoscopic representation of
letter-press viewed binocularly
letter-press viewed binocularly
through Iceland spar.
through Iceland spar.

Stereoscopic representation of

Dove.

the case of a truncated pyramid, we wish to observe the passage of the sectional surface through the base, the change must be so managed that, during the period in which it takes place, both projections may remain in the field of view. This can be effected most simply, if a drawing be regarded with one eye naked and with the other through a reflecting prism, and at the same time be turned through an angle of 180°. I have described this in the Report, 1851, p. 249, and Pogg. 'Ann.' vol. lxxxiii. p. 185. If it be desired to apply this principle to an ordinary lens- or prism-stereoscope, it is only necessary to fasten the two drawings to equal rotating circles, and to set them turning by means of cross strings. As the phænomenon announced by me has since been exhibited by many physicists, it is possible that this contrivance also has been thought of. The last modification, as far as I know, has been published by Henry Halske*, who has shown that by means of complicated mechanism for moving both images in a direction parallel to the line uniting the eyes, the motion of the section perpendicularly down upon the plane of the drawing may be made visible. It is, however, easy to effect this by the motion of a single image. To give an idea of this, I have had the first lines on Slide II. so printed, that now the odd lines, instead of the even ones, are shifted in. The lines that before appeared in the stereoscope depressed, now appear raised. It is clear that if the repeated lines were made moveable on a slide, the motion perpendicularly down upon the plane of the picture would be immediately obvious.

As the double-refracting power of calc-spar decreases with its increasing temperature, while its rhomboidal form approximates continually to the cube, if this change could be carried very far, the *negatively* double-refracting calc-spar, after passing through the state of single refraction, would become at last *positively* double refracting, while the extraordinary ray, which at the common temperature exhibits a less refraction than the ordinary ray, would then exhibit a greater refraction. The experiment above-described explains what would appear with relation to the visible motion of an image seen in a crystal of calc-spar subjected to a continually increasing temperature.

On the Application of the Stereoscope to distinguish Prints from Reprints, or generally Originals from Copies. By H. W. Dove.

The considerable degree to which the lines, in the example which is printed herewith, appear in the stereoscope to be elevated one above another on a comparatively trifling shifting of the lines themselves towards each other in a horizontal direction, shews that we have hereby a means of rendering strikingly visible the difference between prints not absolutely identical. It is obvious that if the interspaces of the individual words are not absolutely equal in the two printed impressions, those which to the naked eye appear in one plane, will (in the stereoscope) rise like steps one over another. The lowest lines of two leaves have been composed of the same type, without the compositor being told that a difference was required, and yet, although the difference of the distance between the second and third words is imperceptible to the naked eye, in the stereoscope the three words rise like steps one over the other—the first word being the lowest, the second higher, the third highest. While, therefore, a second impression of the same sentence appears all in one plane, a new sentence, even though from the same press, and though the greatest care has been taken to preserve the resemblance, will present a perceptible difference. Whether, also, in a new edition only the title has been changed, can be easily determined in the same manner.

What has been said of printing applies of course to copies generally. In the imitation of paper money the criterion of comparison has always been the difference of form. The process above suggested affords a much surer test. If, for instance, a bank note and its copy be laid side by side in the stereoscope, a difference in the position of the words, invisible to the naked eye, becomes immediately obvious, as above mentioned, by an apparent projection out of the plane of the paper. By this means, also, a simple and effectual method is obtained of recognizing a copy of a print or drawing as such. The publication of the process has, it is true, the disadvantage of putting into the hands of those who design to forge such copies the means of testing, by the stereoscope, how closely their work resembles the original; but the difficulty, even with this assistance, of preserving a resemblance bordering on identity is so great that it would rather have the effect of a warning, since the hope of succeeding in making an exact copy is rendered so remote.

The effect of dampness on paper can be ascertained by moistening one of two proofs of the same sentence placed together in the stereoscope. Should there, on the contrary, be a difference between two proofs of the same sentence due to unequal dryness, they may be made to resemble by wetting both. The influence of temperature—on copper-plates, for instance—may be detected in the same manner,

* Pogg. 'Ann.' vol. c. p. 657.

the stereoscope thus playing the part of hygrometer and thermometer.

For the purpose above explained, either the stereoscope should have no bottom, so that it may be placed immediately on the papers to be compared, or, in the place of the four perpendicular dark edges of the table at the bottom, slits should be cut, through which long strips of the proofs to be compared may be drawn, and examined together piece by piece.

If Slides I. and II. be placed at the same time in an ordinary Wheatstone's stereoscope, one on the right side, the other on the left, the alternate projection of the repeated lines is obvious, and is of such a nature that the lines which in the one image are those that project, are those which in the other appear depressed: the letters, however, here appear placed like type. Those who find a difficulty in reading letters so placed, may make use of a Wheatstone's mirror-stereoscope, together with my prism-stereoscope with two prisms (Pogg. 'Ann.' vol. lxxxiii. p. 186. No. 4), which Moigno has called the stereoscope *à réflexion totale*, Wheatstone the *pseudoscope*. In order to detect the dissimilar parts of large plates, the Wheatstone mirror-stereoscope must be so adapted as to admit of plates of whatever size may be desired. This is easily effected by fastening the reflectors, not between two boards, but to a single one, and by leaving only the under groove for the support of the object, the upper groove being omitted. For the purpose of reversing the position of the letters which appear placed like type, a prism-stereoscope may, once for all, be added to a stereoscope of the above description. If it be required to test the identity of two sentences consisting of the same words set up in type, or of two copper-plates before printing, the stereoscope above described is applied at once to the plates, which are laid side by side. In applying the mirror-stereoscope, it is advisable to add two magnifying glasses. If, in this manner, means are afforded to the physicist of testing the equality of the distances between lines, so also the circumstance that in a well-forged bank note the most striking differences immediately show themselves may be cited to justify the application of the stereoscope to the detection of false paper money. It will then be advisable for the Government, if such a note be discovered to be forged, to publish the result of the stereoscopic analysis as an infallible means of detection. If several plates are employed in the preparation of the genuine paper, these must of course be treated as distinct originals. A copy which only presents the slight difference which results from the unequal expansion of the paper, can by the above method be distinguished from one absolutely identical.

[In a future Number we shall refer to the importance of the above paper, both in a scientific and practical point of view. The slides printed on page 295 may be detached and pasted on a card; or they may be advantageously seen by a stereoscope constructed on the principle of Bennett's, referred to at p. 268. —Ed.]

The Archer Fund.

It will be seen from the following statement, that the amount of the subscriptions collected for the benefit of the family of the late Mr. Archer is very nearly £740.

Of this sum, about £98 was received directly by the late Mrs. Archer.

Of the remainder, £618 6*s*. 9*d*. has been invested by the direction of the Committee in Consols, in the names of Messrs. Nathaniel Machin, Samuel Hanson, Alfred Sweeting, and Roger Fenton, as trustees for the orphan children.

A small balance remains at the Bankers, which it is hoped will yet become a considerable one; for there are several subscriptions still unpaid, and there are no doubt many photographers, whose names do not appear in the following list, who will yet put on record their sense of obligation to the late Mr. Archer.

W. J. Newton.
Roger Fenton.

Subscriptions to the Archer Fund received by the Treasurers.

	£	s.	d.
H. M.	20	0	0
The Photographic Society	50	0	0
The Rev. Iltydd Nicholl	20	0	0
Henry Vaughan	10	10	0
Sir W. J. Newton	2	2	0
Messrs. Hopkins and Williams	5	0	0
G. De Morgan	2	2	0
J. H. Aylmer	2	2	0
W. E. Kilburn	2	2	0
A. Farre	2	2	0
H. Bath	10	0	0
R. R. Redway	5	0	0
A. D. Robertson	1	1	0
E. R. Tenison	5	0	0
A. M. Welwood	2	0	0
Sir George Clerk, Bart.	5	0	0
J. G. Bergman	1	1	0
Miss Moore	1	0	0
Miss Hardy	1	0	0
R. B. Clayton	1	0	0
R. Hollond	5	5	0
J. R. Williams	5	5	0
Sir Thomas M. Wilson, Bart.	2	0	0
Coalbrook-dale Iron Works	2	2	0
George Shadbolt	2	2	0

	£	s.	d.
Mr. Storr	10	0	0
Mr. Mayall	21	0	0
Charles Woodward	1	1	0
Dr. Becker	3	0	0
Dr. Beer	1	1	0
Dr. Greenwood	1	1	0
George Jackson	1	1	0
Messrs. Bland and Long	5	5	0
Messrs. Horne and Thornthwaite	5	5	0
W. Bolton	2	2	0
G. S. Cundell	1	1	0
H. Cundell	1	1	0
Mr. Kyle	0	10	0
J. G. Crace	1	1	0
The Rev. W. Ellis	1	1	0
Mons. Victor Delarue	1	1	0
Robert Hunt	2	2	0
T. Jackson	1	0	0
A. Gay	0	10	0
A. H. Taylor	0	5	0
B. W. Fry	2	2	0
R. D. Alexander	2	2	0
R. C. Ransome	2	2	0
Miss Foster	1	1	0
R. Cade	2	2	0
Mr. Steer	1	1	0
The Stereoscopic Company	5	0	0
Lake Price	2	2	0
Mr. Goodman	2	2	0
Messrs. Lock and Whitfield	5	0	0
F. Bedford	2	2	0
J. Leighton	1	1	0
Messrs. Negretti and Zambra	1	1	0
Mr. Malone	2	2	0
The Rev. H. Holden	5	0	0
Messrs. Cundall and Howlett	3	3	0
T. Mackinlay	1	1	0
Alfred Batson	1	1	0
R. J. Hendrie	2	2	0
W. Nicholl	3	0	0
Andrew Ross	5	5	0
John King	0	10	0
B. J. Nowell	0	10	0
H. J. Cook and Son	0	10	6
C. G. Rejlander	2	2	0
W. Bennett	1	1	0
H. White	1	1	0
J. Paul	0	10	6
T. J. Briggs	1	0	0
J. Hickson	1	1	0
T. Lebeau	1	1	0
W. Paine	1	1	0
C. Hockin	1	1	0
S. K. Wilson	1	1	0
W. M. Rosetti	0	10	6
J. Wilks	1	1	0
J. R. Church	0	10	6
Small sums per J. R. Church	1	0	0
B. C. Peirce	5	0	0
A. R. Hamilton	1	1	0
G. Stokes	2	2	0
E. Kater	1	1	0
W. A. Delferrier	1	1	0
R. W. Buss	0	10	6
W. G. Campbell	1	0	0
G. P. Wright	1	1	0
J. A. Silk	1	1	0
E. E. Massey	1	1	0
J. Lane	0	10	6
Major Mitford	1	1	0
Mr. R. Thomas, Pall Mall	10	0	0
Mr. Dalton, of Sydney	3	3	0
Mr. Debenham	5	0	0
T. M. Goodeve	2	2	0
W. Keith	5	0	0
W. Cattley	5	0	0
C. J. Taylor	1	1	0
W. J. Stanton	1	1	0
Roger Fenton	3	3	0
London School of Photography	5	5	0
J. K. Howell	1	1	0
L. Constable	3	3	0
Jones Lloyd	5	5	0
C. J. Leaf	10	10	0
R. Sedgfield	1	1	0
Messrs. Maull and Polyblank	10	10	0
G. Maull	1	1	0
W. Auckland	2	2	0
W. F. Morgan	2	2	0
T. Lockley	1	1	0
F. Hardwich	5	5	0
Caldesi and Co.	2	2	0
Subscription of LEEDS Photographic Society, given at length in Journal of May 21, 1858 (advertisements)	18	7	6
Maltese Photographic Society	5	0	0
Mr. Gutch	1	1	0
Capt. Caulfield	1	1	0
Messrs. Marion	1	1	0
Mr. Camus	0	10	0
Mr. Oswell	1	4	0
Mr. White	10	10	0
C. W. J.	0	10	0
Mr. Sloane	2	2	0
Mr. Marsh	1	1	0
Students of St. Thomas's Hospital (per Mr. George)	4	13	0
Mr. Bourquin	5	5	0
Mr. Tussaud	4	0	0
M. Digby Wyatt	3	3	0
Mr. Sedgwick	1	1	0
Mr. Rippingham	1	1	0
Subscription from NEW YORK (per Scorrell and Co.)	12	0	0
Messrs. Ayles and Bonnisell	1	1	0
J. Mann, Jun.	0	5	0
F. H. Larmouth	0	2	6
John Jubb	0	10	0
M. Anthony	2	2	0
J. Knight	1	1	0
F. H. Hennah	5	5	0
R. Sedgfield (Second Subscription)	1	1	0
P. Delamotte	3	3	0
Messrs. Hockin and Co.	1	0	0
J. B. Hockin	2	0	0
A. Rosling	2	2	0
P. Le Neve Foster	0	10	0
B. B. Turner	1	1	0
Mr. and Mrs. Henry Hodgson	5	5	0
Herbert Ingram	3	3	0
J. Hogg	2	2	0
Messrs. Hering	1	1	0
G. Taylor	0	10	0
C. Mancy	0	10	0
Subscriptions paid in by J. Hogg	3	1	0
Mr. Davenport	1	1	0

	£	s.	d.
Received from BIRMINGHAM Photographic Society:—			
Messrs. Chance and Co.	10	10	0
Mr. Murdoch	1	1	0
Dr. Hill Norris	1	1	0
Mr. W. M. Grundy	1	1	0
Mr. E. Mander	1	1	0
Sir F. E. Scott	1	0	0
W. Sharp	1	0	0
W. Osborn	0	10	6
Messrs. Pershouse and Co.	0	10	0
Mr. Edwards	0	10	0
Mr. Tune	0	10	0
Mr. Henshaw	0	5	0
Mr. Howell	0	5	0
Mr. Dunmore	0	5	0
Mr. Jones	0	5	0
A. E. Gilbert	0	5	0
Mr. Turner	0	5	0
Mr. Bourne	0	2	6
Mr. Gotthiell	0	2	6
Of this amount £20 was sent to Mrs. Archer, and by her paid into the Union Bank to the credit of the fund, Feb. 8, 1858.			
J. D. Llewellyn, Esq	10	0	0
The SCOTTISH Photographic Society	24	7	7
" " " "	7	0	0
NORWICH Photographic Society (per H. Pulley)	5	0	0
J. Elliott, Esq.	10	0	0
Mr. Lloyd	2	0	0
Mr. Terry	1	0	0
Mr. Whitfield	0	10	6
Mr. Guynon	1	0	0
D. J. K.	0	2	6
— Cetti, Esq.	0	5	0
Anonymous	2	0	0
R. V. Heath	5	0	0
The Photographic Society of IRELAND:—			
The Photographic Society of IRELAND	10	0	0
William Allen, Esq.	1	0	0
Messrs. Bewley and Evans	5	0	0
Arthur Barlow, Esq., Jun.	1	1	0
Samuel Bewley, Esq., Jun.	5	0	0
Lieut.-Col. Clarke, Royal Scots Greys	1	1	0
Lester Cleary, Esq.	0	5	0
Sir J. J. Coghill, Bart.	1	1	0
William Dalgleish, Esq.	1	0	0
J. F. Duncan, Esq., M.D.	0	10	0
Lord Otho Fitzgerald	1	0	0
Professor Glukman	5	0	0
Captain Hartley	2	2	0
Captain Henry	2	2	0
William Hodges, Esq.	1	1	0
F. H. Mares, Esq.	0	10	0
Ebenezer Pike, Esq.	2	0	0
Edward Roper, Esq.	0	10	0
Gilbert Sanders, Esq.	1	0	0
James Vance, Esq.	1	0	0
H. T. Vickers, Esq.	1	0	0
William White, Esq.	0	5	0
	43	8	0
Deduct Expenses of Advertising, Printing, &c.	1	0	0
	£42	8	0
Amounts received by Mrs. Archer:—			
Lord Londesborough	5	5	0
Dr. John Diamond	5	0	0
John Garratt	5	5	0
Rev. C. J. Hoggan	5	5	0
Francis Smedley	5	5	0
Rev. W. J. Kingsley	5	0	0
Alfred Tooth	5	0	0
Charles Few	3	3	0
Alfred Ainger	3	3	0
T. and A. Pumphrey	3	0	0
Dr. Farre	2	2	0
Mrs. Wise and the Misses Wise	4	0	0
Charles Brook	1	1	0
T. Willement	1	1	0
R. A. Henry	1	1	0
C. Buttery	1	1	0
Dr. Hyde Salter	1	1	0
Charles Cowper	0	10	0
Mr. W. Whelan	0	10	6
Mr. Machin	5	0	0
C. M.	0	10	0
	63	3	6
Paid by the Photographic Society of MANCHESTER to Mrs. Archer, March 1857	34	16	0
	£97	19	6

Dr.

	£	s.	d.
Total of subscriptions received by Mrs. Archer	97	19	6
Received by Treasurers	636	16	1
Interest on deposit	3	19	11
Ditto	8	5	5
	£747	0	11

Cr.

	£	s.	d.
Received by Mrs. Archer	97	19	6
Cheque Book	0	2	0
Treasury Warrant	1	10	0
Per-centage to Collector	0	10	0
To account paid to Mr. Bourquin	4	1	0
To Printing and Stationery	9	13	2
Expenses of Trust Deed	6	9	0
Invested in Consols	618	6	9
To Balance in hand	8	9	6
	£747	0	11

PATENTS.

Specification of the Patent granted to George Baxter, *of Northampton Square, in the County of Middlesex, for Improvements in Colouring Photographic Pictures.*

This invention has for its object improvements in colouring photographic pictures, and consists in combining with photographic pictures the processes of intaglio plate and surface printing, and also the processes of lithographic and zincographic printing, as a means of colouring such photographic pictures. For these purposes, as many printing plates, blocks, or surfaces are prepared as there are intended to be colours or shades of colours printed on a photographic picture, each printing block, plate, or surface being prepared in a suitable manner to print a portion of the picture with its particular colour or shade of colour, so that when impressions have been taken from all the printing blocks, plates, or surfaces on to a photographic picture, the same will be coloured all over, or to the extent desired. The colours employed may be such as are now ordinarily used in the above-mentioned processes of printing.

And in order that my said invention may be most fully understood and readily carried into effect, I will proceed to describe the method in which I prefer to conduct the process. If it be desired to colour photographic pictures by means of wood blocks, I first make a series of dots along each side of the negative picture, allowing at least two dots for each block to be employed in colouring the positive pictures. I then take from the negative photograph on to ordinary lithographic transfer paper as many positive pictures as it is desired to use blocks in colouring, and I then mark or draw on each of these pictures the parts which are to be printed by one of the blocks, and with one of the colours to be employed this marking or drawing I perform by applying to the pictures, by means of a camel-hair or sable brush, a composition of vermilion, mastic, varnish, and turpentine reduced to the consistency of oil paint. In some cases, in place of printing these photographs on transfer paper, I print them on the common photograph paper, and give them a coating of gum before marking or drawing them as above described. The surfaces of the wood blocks to be employed are prepared by coating them, by means of a printer's roller, with a composition of flake-white and gold-size. When this coating is perfectly dry and hard, a thin surface of transfer varnish is applied to the block in a similar manner, and one of the pictures marked or drawn as before described is laid on the block, and the marking or drawing transferred to its surface by pressure in a common printing-press, such as is usually employed for printing woodcuts; the block is left with the paper upon it until the transfer varnish hardens, and then the paper is washed off with muriatic or other acid diluted with a little water applied by means of a sponge, the marking or drawing remaining on the block.

The marked blocks obtained in this manner are engraved by hand in the usual manner, the parts of the blocks which are not marked being cut away. In employing the engraved blocks for colouring photographic pictures taken from the original negative, they are worked in a press such as is usually employed in printing woodcuts, and each with its appropriate colour; and the photographic pictures to be printed are prepared for the purpose of obtaining register by puncturing each edge with a series of holes, made by means of sharp point holes being made exactly at the points indicated on the picture by the marks produced by the dots made on the negative. Two register points are fixed in the tympan of the press at a suitable distance apart, and one of the photographic pictures is placed on the tympan, the register points entering two of the holes in the picture, one on each side; the block is then adjusted in its position on the bed, so that it may print on to the picture just in the required position. When this adjustment is effected, as many pictures as it is desired to colour are printed by the block, care being taken in laying them on the press to cause the register points to pass through the holes in each picture corresponding with those through which the register points passed in the trial picture or picture by which the register was obtained. Other methods of obtaining register may be adopted; but the system above described is that which I prefer, more especially for the best description of work. In a similar manner the pictures are printed in succession from all the other blocks until the pictures are completely coloured; but I avoid using the register holes more than once, as they are liable to become enlarged by the first use, and if again used, inaccuracy of register might result. In some cases I employ metal in place of wood blocks, the metal which I prefer being that ordinarily used in casting stereotype plates.

To colour photographic pictures by means of intaglio engraved plates, I proceed in the following manner:—I take one of the photographic pictures, such as it is desired to colour, and I make from it a series of tracings, one for each colour; these tracings are made usually with a black-lead pencil, and each tracing has marked on it all the parts which are to receive the tint with which the tracing corresponds.

	£	s.	d.
Received from BIRMINGHAM Photographic Society:—			
Messrs. Chance and Co.	10	10	0
Mr. Murdoch	1	1	0
Dr. Hill Norris	1	1	0
Mr. W. M. Grundy	1	1	0
Mr. E. Mander	1	1	0
Sir F. E. Scott	1	0	0
W. Sharp	1	0	0
W. Osborn	0	10	6
Messrs. Pershouse and Co.	0	10	0
Mr. Edwards	0	10	0
Mr. Tune	0	10	0
Mr. Henshaw	0	5	0
Mr. Howell	0	5	0
Mr. Dunmore	0	5	0
Mr. Jones	0	5	0
A. E. Gilbert	0	5	0
Mr. Turner	0	5	0
Mr. Bourne	0	2	6
Mr. Gotthiell	0	2	6
Of this amount £20 was sent to Mrs. Archer, and by her paid into the Union Bank to the credit of the fund, Feb. 8, 1858.			
J. D. Llewellyn, Esq	10	0	0
The SCOTTISH Photographic Society	24	7	7
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NORWICH Photographic Society (per H. Pulley)	5	0	0
J. Elliott, Esq.	10	0	0
Mr. Lloyd	2	0	0
Mr. Terry	1	0	0
Mr. Whitfield	0	10	6
Mr. Guynon	1	0	0
D. J. K.	0	2	6
— Cetti, Esq.	0	5	0
Anonymous	2	0	0
R. V. Heath	5	0	0
The Photographic Society of IRELAND:—			
The Photographic Society of IRELAND	10	0	0
William Allen, Esq.	1	0	0
Messrs. Bewley and Evans	5	0	0
Arthur Barlow, Esq., Jun.	1	1	0
Samuel Bewley, Esq., Jun.	5	0	0
Lieut.-Col. Clarke, Royal Scots Greys	1	1	0
Lester Cleary, Esq.	0	5	0
Sir J. J. Coghill, Bart.	1	1	0
William Dalgleish, Esq.	1	0	0
J. F. Duncan, Esq., M.D.	0	10	0
Lord Otho Fitzgerald	1	0	0
Professor Glukman	5	0	0
Captain Hartley	2	2	0
Captain Henry	2	2	0
William Hodges, Esq.	1	1	0
F. H. Mares, Esq.	0	10	0
Ebenezer Pike, Esq.	2	0	0
Edward Roper, Esq.	0	10	0
Gilbert Sanders, Esq	1	0	0
James Vance, Esq.	1	0	0
H. T. Vickers, Esq	1	0	0
William White, Esq	0	5	0
	43	8	0
Deduct Expenses of Advertising, Printing, &c.	1	0	0
	£42	8	0
Amounts received by Mrs. Archer:—			
Lord Londesborough	5	5	0
Dr. John Diamond	5	0	0
John Garratt	5	5	0
Rev. C. J. Hoggan	5	5	0
Francis Smedley	5	5	0
Rev. W. J. Kingsley	5	0	0
Alfred Tooth	5	0	0
Charles Few	3	3	0
Alfred Ainger	3	3	0
T. and A. Pumphrey	3	0	0
Dr. Farre	2	2	0
Mrs. Wise and the Misses Wise	4	0	0
Charles Brook	1	1	0
T. Willement	1	1	0
R. A. Henry	1	1	0
C. Buttery	1	1	0
Dr. Hyde Salter	1	1	0
Charles Cowper	0	10	0
Mr. W. Whelan	0	10	6
Mr. Machin	5	0	0
C. M.	0	10	0
	63	3	6
Paid by the Photographic Society of MANCHESTER to Mrs. Archer, March 1857	34	16	0
	£97	19	6

Dr.	£	s.	d.
Total of subscriptions received by Mrs. Archer	97	19	6
Received by Treasurers	636	16	1
Interest on deposit	3	19	11
Ditto	8	5	5
	£747	0	11

Cr.	£	s.	d.
Received by Mrs. Archer	97	19	6
Cheque Book	0	2	0
Treasury Warrant	1	10	0
Per-centage to Collector	0	10	0
To account paid to Mr. Bourquin	4	1	0
To Printing and Stationery	9	13	2
Expenses of Trust Deed	6	9	0
Invested in Consols	618	6	9
To Balance in hand	8	9	6
	£747	0	11

PATENTS.

Specification of the Patent granted to George Baxter, *of Northampton Square, in the County of Middlesex, for Improvements in Colouring Photographic Pictures.*

This invention has for its object improvements in colouring photographic pictures, and consists in combining with photographic pictures the processes of intaglio plate and surface printing, and also the processes of lithographic and zincographic printing, as a means of colouring such photographic pictures. For these purposes, as many printing plates, blocks, or surfaces are prepared as there are intended to be colours or shades of colours printed on a photographic picture, each printing block, plate, or surface being prepared in a suitable manner to print a portion of the picture with its particular colour or shade of colour, so that when impressions have been taken from all the printing blocks, plates, or surfaces on to a photographic picture, the same will be coloured all over, or to the extent desired. The colours employed may be such as are now ordinarily used in the above-mentioned processes of printing.

And in order that my said invention may be most fully understood and readily carried into effect, I will proceed to describe the method in which I prefer to conduct the process. If it be desired to colour photographic pictures by means of wood blocks, I first make a series of dots along each side of the negative picture, allowing at least two dots for each block to be employed in colouring the positive pictures. I then take from the negative photograph on to ordinary lithographic transfer paper as many positive pictures as it is desired to use blocks in colouring, and I then mark or draw on each of these pictures the parts which are to be printed by one of the blocks, and with one of the colours to be employed this marking or drawing I perform by applying to the pictures, by means of a camel-hair or sable brush, a composition of vermilion, mastic, varnish, and turpentine reduced to the consistency of oil paint. In some cases, in place of printing these photographs on transfer paper, I print them on the common photograph paper, and give them a coating of gum before marking or drawing them as above described. The surfaces of the wood blocks to be employed are prepared by coating them, by means of a printer's roller, with a composition of flake-white and gold-size. When this coating is perfectly dry and hard, a thin surface of transfer varnish is applied to the block in a similar manner, and one of the pictures marked or drawn as before described is laid on the block, and the marking or drawing transferred to its surface by pressure in a common printing-press, such as is usually employed for printing woodcuts; the block is left with the paper upon it until the transfer varnish hardens, and then the paper is washed off with muriatic or other acid diluted with a little water applied by means of a sponge, the marking or drawing remaining on the block.

The marked blocks obtained in this manner are engraved by hand in the usual manner, the parts of the blocks which are not marked being cut away. In employing the engraved blocks for colouring photographic pictures taken from the original negative, they are worked in a press such as is usually employed in printing woodcuts, and each with its appropriate colour; and the photographic pictures to be printed are prepared for the purpose of obtaining register by puncturing each edge with a series of holes, made by means of sharp point holes being made exactly at the points indicated on the picture by the marks produced by the dots made on the negative. Two register points are fixed in the tympan of the press at a suitable distance apart, and one of the photographic pictures is placed on the tympan, the register points entering two of the holes in the picture, one on each side; the block is then adjusted in its position on the bed, so that it may print on to the picture just in the required position. When this adjustment is effected, as many pictures as it is desired to colour are printed by the block, care being taken in laying them on the press to cause the register points to pass through the holes in each picture corresponding with those through which the register points passed in the trial picture or picture by which the register was obtained. Other methods of obtaining register may be adopted; but the system above described is that which I prefer, more especially for the best description of work. In a similar manner the pictures are printed in succession from all the other blocks until the pictures are completely coloured; but I avoid using the register holes more than once, as they are liable to become enlarged by the first use, and if again used, inaccuracy of register might result. In some cases I employ metal in place of wood blocks, the metal which I prefer being that ordinarily used in casting stereotype plates.

To colour photographic pictures by means of intaglio engraved plates, I proceed in the following manner:—I take one of the photographic pictures, such as it is desired to colour, and I make from it a series of tracings, one for each colour; these tracings are made usually with a black-lead pencil, and each tracing has marked on it all the parts which are to receive the tint with which the tracing corresponds.

On the Raspberry-syrup Process.

To the Editor of the Photographic Journal.

Lausanne, en Suisse, May 13th, 1859.

SIR,—I think the enclosed print, from a negative by the raspberry-syrup process, will show you the capabilities of that process, as well as the failures to which it is, with all other processes, liable. The plate had been prepared some weeks, certainly five or six, before exposure: the subject a difficult one; for it is seldom you can find a favourable moment to obtain a trace of the Jura Mountains with their snowy fringe, as in this print. There are some markings, you will observe, which must have arisen from a badly-cleaned glass (a thing I do not think I have ever observed since using this process); the film (which your correspondent W. Ireland says always breaks) was torn away at the bottom of the plate by my coat-sleeve. The print is hardly sufficiently printed perhaps, and is badly toned, for I have no chloride of gold to add to my bath. I wish to know whether the metagelatine process described by Mr. Cleaver, or the Fothergill process, so great a favourite at present, give, in the hands of ordinary amateurs like myself, better results than the specimen I enclose? Of course I mean putting out of the question the dirty glass and the accident to the film. I enclose you also a little print from one of the frescoes at Pompeii. I took the negative by the raspberry-syrup process, from a positive on paper (you see the reflected light from the paper and the folds), from a negative taken by my friend Major de Rumine, who is in the suite of the Grand Duke Constantine. He tells me that he has taken 200 stereoscopic negatives of Pompeii and the Bourbon Museum at Naples, and fifty or sixty large negatives of various things of interest. From time to time he has sent me a number of prints from his negatives; and I can assure the lovers of photographs of architecture and antiquities, &c., that they have a great treat in store, for it is my friend's intention to publish a great number of them soon. The negatives are chiefly by the Taupenot process. He speaks very highly of a large Voigtlander orthoscopic lens he possesses, and with justice, for I never saw straight lines in architecture and in copies from frescoes so rendered before. J. LAWSON SISSON.

The coming Season at the Crystal Palace.

As all Photographic Exhibitors at the Crystal Palace will be presented with a free admission, the following notice will, we hope, be useful.

The ensuing season at the Crystal Palace promises to be one of the most brilliant which it has ever had. It will be the year of the "Great Handel Festival." But the Directors, as appears from their programme of arrangements just issued, do not allow the great event to influence the other attractions.

There will be four Flower Shows: the first was on May 18th; the second will be on June 8th; the third, on Sept. 7th and following days; and the 4th on Nov. 9th.

There will be also a series of Six Opera Concerts by the Covent-Garden artistes, in May, June, and July; during which time the delightful Saturday *promenades* will be continued the same as last season; and when the Opera Concerts cease, a series of first-class concerts will be combined with the promenades. Mr. Henry Leslie's Choir will give performances; Concerts of Classical Music will be given by Mr. Benedict's Vocal Association; and the Metropolitan National and Charity Schools will gather again for their interesting performances, as well as the multitude of juveniles instructed on the Tonic-sol-fa method. During the summer months, Mr. Manns will resume the series of Saturday Concerts, which will be continued till the end of the season.

The programme contains a long enumeration of the permanent features of the Palace, which are equally interesting; and allusions are made to the great gatherings and fêtes which always take place, such as the Early Closing Association Fêtes, &c. &c. Altogether the promise of the season is most brilliant.

ANSWERS TO CORRESPONDENTS.

Collodion.—1. The Committee on Collodion have commenced their labours. Every specimen of collodion sent will be submitted to the skilful hands of Mr. Malone, who has undertaken to conduct, on behalf of the Committee, all chemical analysis which shall be required. 2. The best pictures we have seen done by the Fothergill process are by collodion expressly manufactured for that purpose. 3. Old red-coloured collodion will *do* for the Taupenot process; but it is certainly *much* slower in its action than that which is recently made.

An Old Subscriber asks—Can a person copy by photography a print published in this country and entered at Stationers' Hall, or if it is published as "the Act directs"? We are advised that neither can be legally done, if it is a photograph intended for sale.

"*One who wishes to buy the best lens he can get.*"—We cannot undertake to advise you: in our next Number we hope to print the Report of the Committee of the Photographic Society of Scotland on this subject.

We must ask the indulgence of some correspondents until our next issue, and others shall receive a private reply.

Letters of inquiry to the Editor can only be answered through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 86. JUNE 15, 1859.

THE FRENCH PHOTOGRAPHIC SOCIETY.

The Committee appointed by this Society have issued their Report, in the May number of the Bulletin, relative to the award of the prize of 4000 francs founded by the Duc de Luynes. It is of some length, and we may probably print it *in extenso* in a future Number.

Of this sum, 2000 francs are to remain until July 1861. On the present occasion the distribution is made in the following manner:—

A gold medal, valued at 600 francs, to M. Poitevin.

A silver medal, valued at 400 francs, to MM. Garnier and Salmon.

A silver medal, of 400 francs value, to Mr. Pouncy, of Dorchester.

A gold medal, of 600 francs value, to MM. Davanne and Girard.

We heartily congratulate Mr. Pouncy on this recognition by our French photographic brethren of the merits of his labours. Since Mr. Pouncy exhibited before our Society in January last his specimens of carbon-printing, he has effected very great improvements; and we are informed that some of the specimens lately produced by that gentleman leave but little to be desired; and had not his health prevented, we should have been enabled to exhibit at our last meeting proofs of the great advance which has been made.

PHOTOGRAPHIC SOCIETY, LONDON.

Tuesday, June 7, 1859.

P. Le Neve Foster, Esq., M.A., Vice-President, in the Chair.

The Secretary was absent in consequence of a report, which had reached him during the day, of a fatal accident having occurred to one of his sons, who is at sea, but which report turned out to be wholly untrue.

The Chairman stated that he had received from Mr. Horsley, of Cheltenham, a number of prints from a process, as far as the Chairman understood it, based upon the same principle as Mr. Pouncy's, but that he did not use carbon, and, instead, he used pigments of various colours. The process is a secret; but there is a reference to it in some of the 'Photographic Notes,' beginning with No. 70 down to the present time. Mr. Horsley, in speaking of it, says, "The principal advantage of this over the carbon, or any other similar process (independently of its giving all the definition and half-tone of a good silver print), is the great saving of time effected in the getting up of the proofs, which are thus completed within two or three minutes after being taken out of the copying-press, and only require mounting and varnishing. The advantage, compared with silver, is the quickness of the operation, the economy, and non-liability of the prints to fade." The Chairman thought that, probably, some of the defects in the prints exhibited arose from imperfect negatives, and as Mr. Horsley had not sent any silver prints from the same negatives, that matter could not be determined.

As the season was commencing, photographers might try some other modes of print-

ing, and see whether they could not get something good out of them, and not continue trying silver, and silver alone. The Chairman observed that many of the prints exhibited by Mr. Horsley were really extremely good and full of promise, and possessing more promise than perhaps the specimens of the earlier days of photography.

The prints were then handed round for the inspection of the Members.

The Chairman invited criticism. Obtaining no response, he then requested Mr. Malone to describe his camera, which was upon the table.

Mr. Malone stated, that his camera combined in one instrument all the latest improvements for general working, both at home and out of doors, and at the same time with as little complication and weight as possible; of course, all being made with due consideration as to its usefulness. A similar camera, at first sight, appeared to have been made for Mr. Fenton and Mr. Bedford, but that was not so. He had heard remarks as to practice and theory, and he would state that he (Mr. Malone) had worked with M. Claudet and Mr. Talbot, and he would observe, for the sake of others, that that distinction which had been attempted to be made between a practical and theoretical photographer was often an illusion, inasmuch as those who study the theory practise in a small way with the camera. As far as regards the sensitiveness of any given kind of collodion to light, or any given colour or intensity, the experiments of Mr. Hardwich for instance, in his laboratory, are of the same value as the practical efforts of a gentleman who works upon a large scale. However, as regarded the camera obscura, he (Mr. Malone) was no novice. Possessing a solid camera which would take a picture 12 inches square, he was not satisfied, because he found that whenever he made any attempt to lift the instrument, its weight was overpowering during fatigue in hot weather, especially when placed in a large box for carrying; moreover, there was a certain amount of expense attending the carriage of a heavy instrument, and he had endeavoured to get a camera for home purposes, for portraits and for taking views abroad. His camera, for the purpose of carriage, could be taken into two pieces, separating the bottom board from the body—the body being the well-known bellows body from France; the portion of the woodwork to which the lens was attached was furnished with brass pins fastened into slots with a screw; the bottom board was not jointed, so that he had secured its rigidity; by separating it the board could be carried under the arm, and the camera could be carried by the hand. Then there was the portion of the camera which was to bear the plate or paper-holder, and which was attached by brass bindings at right angles with an endless screw, by which the camera was worked and focused, and which also secured the desired firmness; by it you could take pictures from 10 to 25 inches focus, and it could be used within 6 feet of an object; and with an orthographic lens the object might be much closer. The objection that there might be a motion between the two parts of the body of the camera, was obviated by a shifting brass rod with a binding screw, which must always be altered as the focus was altered; and when the required focus was obtained, the screw was again used, and perfect rigidity thus obtained, with no fear of slipping. By having two such rods of sufficient length to project beyond the front, a black velvet or cloth screen could be hung above the lens. The camera was sufficiently strong, of half-inch wood, and made of teak, which appeared not to be well known, because it had been remarked that it was heavier than mahogany, and that was not the fact; the whole weight of his camera was 22 or 23 lbs. In the front he had attached a ring for a Ross's lens, which would cover a plate 13 inches square. Although so much had been said about the orthoscopic lens superseding the others, he would not part with the Ross's view-lens he held in his hand for any orthoscopic lens; and he knew what they were, for he had a Ross's orthographic lens. If he had a picture with a building at the corner of a street coming into the front of a picture with buildings on the other side of the street, by the old Ross form of lens that straight line, being much nearer the lens, would be barrel-shaped. By this lens (holding up his Ross lens), a building so placed would be represented as standing out, with an appearance of strength; but, with an orthoscopic lens, the lines would not be barrel-shaped, but pincushion shaped, falling over into the street, which was a very serious point; and he was not speaking from fancy, for there was a gentleman present who could show the result. In the front of his camera, Mr. Malone had placed a ring for a 3¼-inch Ross's portrait-lens, which ring he could use interchangeably for a Ross's single combination; and when he wanted the orthoscopic lens, he added an adapter of brass to the ring. It was necessary to have with such a camera even, a 5-inch double combination lens, having a focus to cover this plate, in which case it would be necessary to have a larger ring, with an adapter to carry the 3¼-inch lens and another adapter to take the orthographic lens. Now, having got a Ross's lens, there was then the question of a sliding front. An eminent photographer once proposed to take a view of a loft-door and ladder, and he began by pointing his camera upwards; upon which an artist said, "You are not going to take it in that position?"—"Oh, yes," said the photographer, "there is no other way."—"Then," said the artist, "I would not take it at all." Reflecting upon this anecdote, he (Mr. Malone) had determined to make his front slide up and down only, and not horizontally. To the plate-holder he had added the movement of the swing-back, which is useful when the object is very near and lofty; he had avoided the double-sliding front and the double swing-back, to avoid additional weight, complication, and expense; he had a groove made *in the sliding back* to carry the ground-glass screen. There was one point that he had been very anxious about, and that was the possibility of light getting into the camera through the orifice where the shutter draws up; there were three remedies for that: covering it with a focusing-cloth—making the shutter to slide upon an incline—or tilting the shutter halfway between the horizontal and vertical when fully drawn up. The camera was made by Mr. Ottewill, and Mr. Malone had no doubt it would work well.

Mr. Dwyer asked the price of such a camera, and was told by Mr. Malone about £12; upon which, Mr. Dwyer said the reason he had asked was, that he had purchased in Paris, of Jamin, a camera with screw adjustment behind, and swing-back with bellows, and shutting up as Mr. Malone's camera did, for half the price.

Mr. Heath, of the firm of Murray and Heath, said he was disappointed, as Mr. Malone had told him a few days before that he (Mr. Malone) was armed at all points. Mr. Heath saw nothing new in it; more than that, it was far behind the cameras made at the present day. The camera was not essentially a portable camera, and that bottom board was a serious objection. It was not for Mr. Malone, or anybody else, without proof, to say that that bottom board could not be made rigid if hinged, because that is a mere question

of mechanics; and he could say more, that it can be made more rigid if hinged than that of Mr. Malone's. With respect to the sliding-front, if it were necessary to have it slide up and down, there was the same necessity to slide horizontally; and the same with the swing-back, it was necessary to duplicate it. How was a camera of that kind to be trusted in the delicate (?) hands of a railway-porter? The grooves at the bottom are spoiled by the boy who brought it to the Society; and as to the joints at the bottom, some one—not a boy, but even he who praises his camera, and likes it as his last child—may spoil those points. He thought it must be a satisfaction to the Meeting to see that Mr. Malone had a camera of that size; but as there was nothing in it that was new, the Society should not be occupied for three-quarters of an hour by Mr. Malone's description.

Mr. Sebastian Davis said, that having had a similar camera presented to him some time since, it struck him that there was a point that might be improved, viz., it seemed an objection that, with a bellows camera as at present constructed, one could only move the back part at right angles to the lens; it would be a great convenience, when taking the corner of a street for instance, to have a thumb-screw working in a slot at the bottom part of the back, to shift its angle. Mr. Davis agreed with Mr. Heath as to the sliding front; for without the horizontal movement, one cannot have the vertical when the camera is in a certain position: he also agreed with Mr. Heath as to the bottom-board; and not being able to see any novelty in the camera, he also deprecated the consumption of time by Mr. Malone.

Mr. Shadbolt objected to all the principles laid down by Mr. Malone, from the beginning to the end; but there were two observations that he made, which required some attention at the hands of photographers, to one of which Mr. Shadbolt could speak practically, viz., the substitution of teak for mahogany. Teak neither stood better, nor was it lighter; the only reason that can be given is, that Moulmein teak invariably comes here of a character quite plain—that is, with the grain perfectly straight, whereas mahogany comes with the grain considerably twisted or waved which has a tendency, when exposed to the sun, to warp; but when it is remembered that every carriage has its panels constructed of mahogany, exposed to every variation of temperature and every sort of usage, it will be evident at once, that if the kind of mahogany be properly selected, nothing can be better. It is the plain Honduras mahogany, known technically as "*carriage-board.*"

Then as to the swinging-back, which was of very great advantage, and ought to swing both ways; but if limited to one way, he (Mr. Shadbolt) certainly should not swing it in the direction of Mr. Malone's swinging-back. Having said that, he proceeded to show, on the diagram-board, how the effect of a swinging-back could be had at a mere bagatelle of expense, and a still more trifling additional weight.

Mr. Ennell stated, that if he had known Mr. Malone would have brought forward his camera this evening, he would have exhibited one constructed by Ottewill according to his (Mr. E.'s) instructions. There was one point of Mr. Malone's, as to the focusing-screen, which did not go far enough. When in use, he took it in and out of the camera, placed it here and there, until at last it got kicked to pieces, all which could be obviated by making the screen so that when the proper focus was obtained it could be displaced by the back slide wedging in before it,—the only addition requisite to do which, was some pieces of india-rubber behind the screen, which would be compressed upon the insertion of the sliding back, allowing the screen to take a position behind the back slide, and, upon its removal, force the screen again into its place. Then as to the top of the slide admitting light: before it be covered over—and, indeed, the very act of raising the focusing-cloth will allow a ray of borrowed light, whether from the zenith or elsewhere, to find its way to the plate. Now Daguerre, from the beginning, had no slide at all, but only a door, which admitted, not light, but dust. Voigtlander had a camera with a door, and from the beginning worked with a door. Mr. Ennell gave Ottewill instructions to make his focusing glass upon the principle described, and he had done his work to Mr. Ennell's satisfaction. Mr. Ennell then announced that he should be happy to read a Paper upon Manipulation and Contrivances.

Mr. Malone replied upon the whole argument, and received a vote of thanks.

Mr. Shadbolt wished to draw the attention of the Council of the Society to the consideration of the possibility of exercising some sort of supervision as to the Patents which are to be granted to people who are continually interfering with the free use of matters connected with photography. In the last Journal there was a specification for that which was laid before the Society two years ago. That was being repeatedly done, and was a matter which it was very desirable should be got under control, if it were possible.

Mr. Hughes suggested, that in the coming season proper notice should be given to Members of the ensuing discussions.

The Chairman said the Council would entertain the suggestions, and then adjourned the Meeting until the first Tuesday in November.

PHOTOGRAPHIC SOCIETY OF IRELAND.

This Society met as usual, in the School of Art of the Royal Dublin Society, on the evening of Friday, the 27th May,—Gilbert Sanders, Esq., in the Chair.

The Minutes of the last meeting were read, signed, and confirmed.

Mr. Allen, who acted for the Honorary Secretary during his temporary absence, stated that it was in contemplation to offer prizes for photographs, to be competed for by the members in December and February next.

The Chairman then stated that he hoped the Council of the Society would make arrangements at as early a day as possible to have the prize lists published and distributed among the members, so as to enable them to produce works during the recess for the ensuing competition in November. There might perhaps be some little disappointment that the prize medal was not as yet procured; but he thought it much better that there should be some little delay in the selection, so as to secure one worthy of the Society and suggestive of the subject for which it should be given. A pattern of

such a one had been procured; and it occurred to him that the head of Minerva, as the patroness of the Arts and Sciences, might perhaps be the most appropriate design they could adopt on one side, and an ornamental inscription on the other. The Chairman then caused the design in question, taken in soft metal, to be handed round among the audience, and called on Mr. Nelson to read his paper on "A New Dry Collodion Process," the chief points in which are, that the plates are in the first instance coated with dilute albumen, and afterwards with collodion in the ordinary way; the drying process is conducted in a wooden or tin chamber, into which a vessel of sulphuric acid is introduced; and the affinity which that acid has for water causes them to dry in a very short time without the aid of artificial heat. The advantages it is stated to possess are, the ease and certainty in its manipulation, less trouble in cleaning the plates, less liability to stains and blisters, and the use of only one nitrate-of-silver bath. The paper was referred to the Council for publication; and the Society then adjourned for the Session.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

May 16, 1859.

The 17th ordinary meeting of this Society was held this day at the Golf Club House, the President, J. Glaisher, Esq., F.R.S., in the Chair. After the usual business had been transacted, Messrs. Chatteris, J. Busk, and Dr. Kidd were duly elected members of the Society.

The President proceeded to read a paper which was a continuation of that read before the Society on the 21st of March last, entitled "The Application of Photography to investigations in Terrestrial Magnetism and Meteorology as practised at the Royal Observatory, Greenwich."

Having described and exhibited diagrams of the apparatus by which a ray of light from a small lamp is concentrated upon the sensitive paper enclosed in a glass cylinder kept revolving at a uniform rate by a chronometer, the ray being received upon and reflected from a mirror fixed by a stirrup upon a bar magnet, which has free motion in a horizontal direction through a lens fixed for the purpose before the cylinder containing the sensitive paper, the nature of the curves registered by the deflection of the magnet and the mode of calculating their value from a base line was described, the lecturer adverting to the "magnetic storms" which are upon record, and showed that they were synchronous at the various parts of the globe where observations are registered. He then proceeded to describe the chemical processes employed in the photographic operations for the self-registration of the variations in position of magnetical, and of the variations of readings in meteorological instruments.

First operation. *Preliminary preparation of the paper.*—The chemical solutions used in this process are the following:—

(1) 16 grains of iodide of potassium are dissolved in 1 ounce of distilled water.

(2) 24 grains of bromide of potassium are dissolved in 1 ounce of distilled water.

(3) When the crystals are dissolved, the two solutions are mixed together, forming the iodizing solution. The mixture will keep any length of time. Immediately before use, it is filtered through filtering paper.

A quantity of paper sufficient for the consumption of some little time is treated in the following manner sheet after sheet.

The sheet of paper is placed upon a board covered with oil-cloth, somewhat smaller on all sides than the paper,—a condition necessary for preventing the iodizing solution from running under the edges of the paper. The paper is usually pinned on the left side of the board. A sufficient quantity (about 50 minims for a sheet of paper 15 inches long and 9½ inches broad) of the iodized solution is applied by pouring it upon the paper in front of a glass rod, which is then moved to and fro till the whole surface is uniformly wetted by the solution.

The paper thus prepared is allowed to remain in a horizontal position for a few minutes, and is then hung up to dry in the air; when dry, it is placed in a drawer till used.

Second operation. *Rendering the paper sensitive to the action of light.*—A solution of nitrate of silver is prepared by dissolving 50 grains of crystallized nitrate of silver in 1 ounce of distilled water, adding in hot weather a few drops of acetic acid.

Then the following operation is performed in a room illuminated by yellow light.

The paper is pinned as before upon a board somewhat smaller than itself, and (by means of a glass rod, as before) its surface is wetted with 50 minims of the solution. It is allowed to remain a short time in a horizontal position; and if any part of the paper still shines from the presence of a part of the solution unabsorbed into its texture, the superfluous fluid is taken off by the application of blotting-paper. The paper, still damp, is immediately placed upon the interior glass cylinder, and is covered by the exterior glass cylinder, and is mounted upon the revolving apparatus, to re-

ceive the spot of light formed by the mirror which is carried by the magnet.

Third operation. *Development of the photographic trace.*—When the paper is removed from the cylinder, it is placed upon a board, and a saturated solution of gallic acid, to which a few drops of aceto-nitrate of silver are added (in hot weather this solution is used at the temperature of the air; in cold weather it is heated to the temperature of 70° or 80°), is spread over the paper by means of a glass rod; and this action is continued until the trace is fully developed. When the trace is well developed, the paper is placed in a vessel of water, and repeatedly washed with several successive supplies of water, a brush being passed lightly over both sides of the paper to remove any crystalline deposit.

Fourth Operation. *Fixing the photographic trace.*—The photograph is placed in a solution of hyposulphite of soda, made by dissolving 4 or 5 ounces of the hyposulphite in a pint of water; it is plunged completely in the liquid, and allowed to remain from one to four hours, until the yellow tint of the iodide is removed. After this the sheet is washed repeatedly with water, and afterwards placed within the folds of linen cloth till nearly dry. Finally, it is placed between sheets of blotting-paper, and a heated iron is passed over it.

Chemical proportion, and treatment of the Photographic Paper for Negatives.

First operation. *Preliminary preparation of the paper.*—The chemical solution required for this purpose is as follows:—Two grains of chloride of ammonia are dissolved in 1 ounce of distilled water.

A sufficient quantity of this solution is placed in a flat-bottomed porcelain dish, and sheets of paper, one by one, are plunged within it, care being taken that no air-bubbles remain between the paper and the solution; this may be prevented by slight pressure over the sheet by means of a bent glass rod. When a few sheets are thus immersed, they are turned over in a mass, and are taken out one by one and hung up to dry.

An equally good result is obtained by spreading over one side, by means of a glass rod, as in the proportions before described, a solution of chloride of ammonia, made by dissolving 5 grains in 1 ounce of distilled water.

Second operation. *Rendering the paper sensitive to the action of light.*—The solution required for this purpose is as follows:—To a filtered solution of crystallized nitrate of silver (made by dissolving 50 grains of nitrate of silver in 1 ounce of distilled water) some strong solution of ammonia is added; the whole becomes at first of a dark-brown colour, but when a sufficient quantity of ammonia is added the solution becomes perfectly clear; a few crystals of nitrate of silver are then added till the solution is a little dull; it is then ready for use.

The following operation is performed in a room illuminated by yellow light:—By means of a glass rod, this solution is spread over the paper whilst pinned on a board; the paper is dried before a fire, and is then in a fit state to be used for producing a negative.

Third operation. *Formation of the photographic negative.*—A sheet of the paper so prepared is placed upon a bed made of flannel and blotting-paper, resting on a sheet of plate glass, with its prepared side upwards; the original photograph is then placed on the paper with its own face downwards; and as it is necessary, for obtaining a correct copy of the original, that it should be in close contact with the prepared surface, a second sheet of plate glass is placed over it, and the two are pressed together by clumps and screws, or the photograph and sheet of paper are placed in an ordinary printing-frame, and pressed together by its arrangements: the whole is then exposed to the light (the original to be copied being above the paper on which the copy is to be made). The time required to produce a negative depends in a great measure upon the thickness of the paper on which the original is made, and on the actinic quality of the light; a period of five minutes in a bright sunshine, or an hour in clear daylight, is generally sufficient.

Fourth operation. *Fixing the photographic negative.*—When an impression has been thus obtained, it is necessary that the undecomposed salts of silver remaining in the paper be removed.

For this purpose the negative is at once plunged in water and kept moving, a brush being passed over both sides. It is then immersed in a solution of hyposulphite of soda (made by dissolving 2 or 3 ounces of the hyposulphite in a pint of water), and is left through a period varying from half an hour to several hours. It is then removed and washed in plain water several times, and running water is allowed to pass over it for twenty-four hours. The sheets are then placed within the folds of drying-cloths, till nearly dry, and finally ironed between sheets of blotting-paper.

The process of obtaining copies of the originals from the negatives, is in every respect the same as that of obtaining a negative from the original.

At the conclusion of the paper, Mr. Heisch remarked that the proportion of iodide and

bromide of potassium used in sensitizing the papers was as nearly as possible two of bromide and one of iodide.

A vote of thanks was unanimously tendered to Mr. Glaisher for his able paper; and Messrs. Kent, Crossland, Kieser, and Skaife having been proposed as candidates for future election, the meeting adjourned.

Second Annual Report of the Council of the Blackheath Photographic Society.

The lapse of another year brings round the Second Anniversary of the Blackheath Photographic Society, and the Council have the pleasure of presenting their Second Annual Report.

The Council heartily congratulate the Society upon its present prosperous condition.

During the past year, the Society's numbers have been recruited by the introduction of many of the influential residents in the neighbourhood, several practical photographers, and all zealous to promote the art of photography.

The Treasurer's account is annexed, exhibiting a balance of £49 11*s.* 2*d.* in favour of the Society.

The *soirée*, which was held at the Mansion House, by the kind permission of the Right Hon. the Lord Mayor, on Friday, the 15th April, was eminently successful; and the works of Messrs. Glaisher, Heisch, Melhuish, Knill, Ledger, Smith, Spencer, Wire, and Wood, were such as to elevate the character of the Society from which they emanated. The following gentlemen contributed also materially as exhibitors to the success of the Exhibition: viz. Messrs. Bedford, Bell, Bunning, Burfield and Rouch, Claudet, Cumming, Delamotte, Fenton, Frith, Horne and Thornthwaite, Jones, Knight, Ladd, London Stereoscopic Company, Murray and Heath, Malone, Negretti and Zambra, Ottewill, Paul Pretsch, Powell and Leland, Pillischer, Rayne, Reeve, Rosling, Ross, Salmon, Shadbolt, Smith and Beck, Thurston Thompson, Turner, White, Williams, E. G. Wood, and Herbert Watkins. To each of these gentlemen the Council beg to tender their warm acknowledgments.

The Council regret that so few strictly scientific researches have this year to be reported, as from these only can fundamental improvements be expected. M. Nièpce de St. Victor continues his experiments upon the so-called storing up of light. Without actually ignoring his facts, a careful examination of his experiments, as reported by himself, convinces the Council that they by no means justify the theory he has raised on them. The fact that the bodies supposed to contain the bottled light exercise their reducing action only through porous substances, such as paper, and have no action through glass or other non-porous substances, however transparent, while the reducing action of light passes most easily through transparent bodies, quite independently of their porosity — coupled with the admission by M. Nièpce, that heat, vapour of water, and anything which favours the passage of vapours through such substances as paper, materially assist, if indeed they be not essential to the supposed new action—renders it more than doubtful if light have anything to do with the matter. It is also worthy of remark, that none of those accustomed to scientific investigation, who have attempted to repeat his experiment, taking the most moderate precautions against self-deception, have ever succeeded; while Mr. Crookes has shown that at least one of his experiments is quite as successful with substances that have been kept rigorously in the dark. On the whole, the Council see no more reason for ascribing the effect produced by M. Nièpce to light, than they do for attributing anastatic printing to the same agency, because the nitric acid, employed in that process, penetrates the white parts of the paper, and attacks the zinc plate beneath them, while it does not attack those parts which are covered by the ink. In another direction, however, M. Nièpce's experiments seem to have led to more satisfactory results. He has added to the number of substances which receive an impression from light capable of after-development; and the uranium printing process, founded on these experiments, promises to become of some importance. M. Chevreul, in an appendix to M. Nièpce's last paper, points out the necessity of distinguishing between such substances as are acted on by light alone, and those which are only affected when oxygen is present; and gives a list of those substances on which light acts *in vacuo*, and of those on which it only acts in the presence of air, or of oxygen, or of those bodies in conjunction with moisture.

The Council must also bring under the notice of the Society Mr. Pouncy's Carbon Printing Process; for though they can by no means agree with him in his assertion that his prints are quite equal to silver ones, the immense strides he has made, in a comparatively short time, render his process one of great promise. At the same time, the Council cannot but remark that the conclusion that the prints must be as permanent as those made with printers' ink, because in both carbon is the colouring matter employed, has been much too hastily arrived at, as it has yet to be proved that the glue and bichromate of potash employed as a vehicle, is as unalterable as the oil, resin, &c., which enter into the composition of printers' ink.

The discovery of Mr. J. H. Young, that the invisible image on a collodio-albumen plate can be developed, after the removal of the iodide of silver, by hyposulphite of soda, or cyanide of potassium, is too important to be passed over without notice, showing, as it does, that the change produced in the iodide of silver by light is even greater than has hitherto been thought. At present, it does not appear that he has produced any but transparent positives, printed from negatives by superposition; so it remains to be seen if the comparatively feeble light of the camera is capable of producing the same effect.

The Council would take the opportunity of reminding Members of the forms for the registration of observations with which they were last year furnished, none of which appear, up to the present time, to have been filled up. They would press upon members the necessity for a little exertion on this point, as it is only by a comparison of a number of observations, made in different

places, and under various other considerations, that any good results can be hoped for. With a view to facilitate these observations, Mr. Heisch has prepared shorter forms, embodying only the most important points, and those which can most easily be attended to in the field.

Through the continued kindness of the Golf Club, the meetings of the Society have taken place during the past Session at the Golf Club House; the Council therefore offer their best thanks to the Officers of the Club for affording them a *locus standi*.

The following brief list of Papers read during the Session will show the energy and intellect which have been exercised on behalf of the Society by some of its leading members; and it is pleasing to record the fact that the Journals specially devoted to photography, and some of the local newspapers, have given a preference to many of the Society's papers in their publications, and, by making them the subject of favourable criticism, have demonstrated their original and instructive character. The Council have to acknowledge, with many thanks, the great, nay, the special courtesy shown them by the press generally, and particularly by the editors of the local press, who have not unfrequently, during an unusual pressure of business, given insertion to, and notice of, the transactions of the Society.

The following is a list of Papers read during the Session:—

"On the Simultaneous Photography of various Coloured Objects." By Mr. Heisch.

"A week with the Camera among the Hills of Kent." By Mr. Wire.

"On Nautical Photography," by Mr. Skaife, showing his "instantaneous method" of taking Photographs.

"On two main points in Photography." From Herr Paul Pretsch, read by the President; and, from the same source, a paper on Pretsch's "Photogalvanographic Process."

"On Metagelatine, as a substance for mounting Photographs." By Mr. Heisch.

"On the Dry Collodion Process." By Mr. Heisch.

"On the application of Photography to Investigations in Terrestrial Magnetism and Meteorology, as practised at the Royal Observatory, Greenwich." By Mr. Glaisher.

The new forms of lenses are still exciting much discussion. The members have had some opportunity of judging of the results obtained with them at the late exhibition at Suffolk Street. The pictures by Mr. Bedford were mostly taken with a Grubb lens, those by the late Mr. Howlett with a Ross Petzval.

The Society, since the publication of the last Report, have to regret the loss of several members, from various causes, chiefly through removal from the neighbourhood, among whom should be especially noticed the name of G. Busk, Esq., F.R.S. The Council record the secession of such with regret. While acknowledging with thankfulness the labours of those members who, in the midst of important avocations, have kindly devoted their time to the production of papers for the intellectual gratification of the Society, the Council have to urge upon other members the necessity of contributing somewhat to its intellectual maintenance, recording their opinion that a failure in this particular presses somewhat unfairly upon those gentlemen who have already exerted themselves so much in that direction. In conclusion, the Council point with satisfaction to the position the Society has obtained in public estimation, and venture to add that such combinations cannot fail to exert a beneficial influence upon the community at large, fostering, as they do, two important principles, viz. the extension of scientific information and original research, and the bringing together, for that result, those who are desirous of cultivating knowledge.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

This Society held its second meeting on the 9th inst. in the large room of the Walworth Literary and Scientific Institution, Mr. A. H. Wall in the chair.

It having been suggested by the Chairman, that the more important business of confirming rules and electing officers should be deferred until the arrival of all the gentlemen expected to attend, the members passed some little time in examining the few objects of interest provided by some of them.

Some stereoscopic pictures were exhibited as specimens of Fothergill's dry process, taken by Mr. F. Howard; these were very beautiful, exhibiting every perfection of detail in both lights and shadows, and of a very pleasing tone.

A camera-stand and dark slide were shown by Mr. W. Ackland, as a portion of an extremely portable and effective apparatus intended to accompany himself upon a continental pleasure-excursion.

Mr. Leake exhibited a tent, which he stated to be tolerably portable and efficient; it stood well against wind, was easily set up and taken down, was not in many pieces, and is very cheap, costing about one guinea: during last year he took nearly a hundred 12×10 views in one of similar construction, and found it to answer perfectly.

This tent consisted, first, of a shallow box or tray, about 30 inches in length, 18 inches in width, and 2 inches in depth, made of ½-inch pine-deal, strengthened by wooden blocks at the angles, and forming the table or bottom of the tent; secured to this was a gutta-percha tray with a pipe attached, which, by acting as a sink, keeps the bottom of the tent always dry and clean.

The lid of this tray formed the top of the tent; round the inside of the bottom and outside edge of the top was secured the lining, forming three sides of the tent, and consisting of two thicknesses of black and one of yellow calico, sufficient light being admitted for work through the yellow by a small square aperture

in the black calico; light iron rods about 2 feet 5 inches in length supported the top when the tent was erected, and shut into the case when it was packed.

Over the opening in front, was suspended by hooks a curtain of the same description as the lining, large enough to wrap round the operator and exclude the most inquisitive of solar rays.

A small plate-box was placed in the tray, and packed, with the lining, curtain, and rods, in the case. This tent or box was fixed on an ordinary tripod stand by a screw through the bottom; but Mr. Leake informed us that he had a very light portable stand for the purpose, and that this with the tent weighed 14 lbs., and was carried very conveveniently by the handle attached to its side. The tent exhibited was for pictures 12 x 10; a smaller one was made for stereoscopic pictures.

No discussion ensued, inasmuch as the Chairman called attention to the business more particularly claiming attention.

The Chairman read the minutes of the previous meeting, and referred to the steps which he with the members of the Provisional Committee had taken for that purpose. A set of rules being read, were, with some few alterations, adopted.

The Rev. F. F. Statham was then elected President.

Mr. W. Ackland was elected Vice-President, Mr. F. Howard, Treasurer, A. H. Wall, Hon. Secretary, and the following gentlemen to form a Committee: viz. Messrs. Cotton, Hervé, Hannaford, Leake Sen., Clarke, and Leake Jun.

The Secretary then proceeded to receive the names of members, and announced that the number already given promised very favourably for the Society's future well-being.

As nothing formal characterized these proceedings (and business proceeded none the less smoothly for the same), a cordial warmth seemed to unite all present in a genial glow of social fellowship, which we hope may always exist to accelerate the progress of this infantine Society.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith. The same proviso extends to communications to the Editor.

On various Salting, Sensitizing, Toning, and Fixing Baths, with Specimen-formulæ. By C. J. Burnett, Esq.

[Continued from March 21, page 229.]

A very weak solution of protosulphate of iron, with the addition first of a little citric or tartaric acid (to prevent ultimate precipitation of brown sesquioxide, which may be formed), and then of enough ammonia to saturate both acids and liberate and hold in solution the protoxide, may also be found useful as a testing-bath for the presence or absence of unreduced silver in the lights of the picture; and a similar bath may be made from the protosulphate of manganese instead of iron (with or without acids): could it be found practically possible to dissolve out, by hyposulphite or other solvent, the unchanged portion of the bromide, chloride, or *iodide* of silver in our *positives* or negatives, while leaving intact the allotropized or otherwise actinically altered portion, we might with advantage use these mixtures, as well as simple unacidulated ferrous (and stannous) salts, as *developing* agents also,—such processes, if possible, proceeding so far on the same plan or model as Messrs. Beauregard and Selle's ink-process, or more closely resembling my ink-process on paper prepared with binoxalate of iron and chromate of ammonia, or still more closely my cobalt printing-process, or cupro-type process with bichromate of copper, or the developments* of the uranic papers with silver-salts, ferrid-cyanides, palladium, tannic or gallic acids†, &c., which I have shown to be possible after washing out the unactinized part of the salt‡.

* I was also much interested to find an *excess* of ammonia (after what is necessary to keep the ferrous or manganous oxide in suspension) may actually be made to act as a retarding agent; so that we may possibly be thus enabled to utilize such solutions for development of even *unwashed-out* prints or negatives.

† These being also capable of being made a basis for deposition of gold or platinum from alkaline solutions, and the same being the case with our ordinary ink-prints with platinum.

‡ Knowing, as we do, how solubility is frequently altered by one class of wave-powers—that known as heat (as in the cases of sulphur, phosphorus, silicic acid, chromic oxide, ferric oxide, titanic acid, tungstic oxide, stannic oxide, iodide of mercury, oxide of silver),—it is only natural to look out for similar changes effected by other classes of wave-powers, *e. g.* those known as the actinic. How to connect such change with a deoxidizing action and the greater facility of reduction where no chemical change is as yet known to exist, is the pro-

The great facility in fixing the uranic and ferric silver-developed prints with ammonia is evidently caused by the very small proportion of silver-chloride they contain being no more

blem, and makes this case of the silver iodide a very different one from that of the uranic and ferric salts where, aided by the organic matter of the paper (in the case of nitrates and sulphates) or of a vegetable acid, there is a chemical reduction clearly demonstrable, the resulting protoxides' insolubility being also possibly owing either to expulsion or decomposition of part of the acid, or to its (the oxide's) entering into combination with, say, the vegetable fibre of the paper. As to the *rationale* of the developable image on silver salts, we have no absolute proof that there may not be change in the chemical arrangement of the atoms; besides, the discoveries of Sir J. Herschel and Schönbein with regard to active and passive iron, &c., might suggest the possibility of the silver in the iodide being convertible into an allotropic silver, whose salts might be supposed to exercise a reducing action on those of normal silver; still I should be fully as sanguine of an explanation of the phenomena being arrived at through a careful comparison with those of fermentation, cremacausis, and putrefaction. In the case of ordinary fermentation, we find two classes of compounds mainly concerned,—one being solutions of saccharine and other organic compounds, in themselves little or not at all liable to change; and the other, various azotized matters in which a change is readily originated, and which have the power, by their contact with the former class, of communicating to them their own state of change (or rather, I should say, *a* state of change originating in them). This would exactly correspond (the change-originating power, or disturbing force, being however in the one case generally the wave-power known as "heat," and in the other the so-called "actinic" wave-power) to the case of our ordinary sensitive papers containing oxide of silver (or nitrate or other salt of it) in combination or contact with iodide, bromide, or chloride, the change being, in the first class of salts (connected probably with the ozonization of one of these elements), comparatively easily set a-going, and they having the power, after actinization, of communicating or inducing (and keeping up, it may be) their or *some sort of* change in the other class of salts. The case of the invisible actinic picture on the collodion, or albumen, or other surface having the power of determining or promoting the decomposition of fresh nitrate of silver applied to it would then also correspond to the placing of yeast or other nitrogenous matter in a state of change (or after its having undergone a certain change) in contact with a solution of sugar, the comparative insolubility of the body in which the change originates (especially after change) being also a point of resemblance worthy of note. I have elsewhere called attention to the fact that this chain of analogies extends not only among the phenomena of actinization, the fermentations, cremacausis, and combustion, but may be traced also in the phenomena of febrile diseases, contagion and infection, and probably also in those of malaria and miasma.

I have also expressed my belief that the analogies are anything rather than mere surface-analogies. Without any desire to dogmatize, I would suggest that, unity in variety being the essence of Nature, and the discovery of this unity the legitimate object of our science, any hypothesis is especially deserving of consideration which would lead to this by pointing out an intelligible relationship between the hitherto rather isolated phenomena of photography and other classes of phenomena which, however mysterious, are yet, to some extent, better known and investigated, making them thus shed light on each other; and it may perhaps be allowed to add to its claim as a hypothesis, if it gives any hope of our being able by its aid to trace still further the chain of relationships, so as to help us towards something like a scientific idea of other phenomena hitherto so hopelessly isolated as to have even tempted men, otherwise rational and intelligent, to throw doubt (in the case of infection) on matters demonstrated by every-day experience, or to frame and support with confidence (in that of malarious influence) theories directly contradicted by easily-ascertained facts.

Without going into the minute ramifications of our hypothesis, we would, before leaving the subject, just throw roughly together a few of those phenomena which it would associate as all essentially connected with undulatory motion, which has been long pretty generally acknowledged to be the essence of some of them, or as being, at all events, in some way causally allied:—

Class I. Comprehending, 1. Combustion as propagated by actual contact with a body burning (the body set fire to being either a part and continuation of the burning body, or a separate body brought into contact with it). 2. Fermentation and putrefaction by contact of the same or another body. 3. Febrile or other diseases by contact,—the analogy with fermentation having been pointed out by Baron Liebig. 4. Action of gastric juice, saliva, &c. (having been shown to act away from the animal), and probably many of the other animal processes of *secretion* and nutrition, and also the allied processes in plants. 5. Photographic phenomena, in positive printing and in negative-taking, where chlorides or iodides either assist by their presence during the solarization of oxide-salts, or, being themselves solarized, acquire the power of afterwards determining or producing a state of change in other classes of silver salts (or mixtures of them with gallic acid) brought into contact with them. [The first action may be considered analogous to the employment of wood-shavings or paper, and wood mixed with the coals, to aid in the ignition of a coal-fire, or the presence of the nitrogenous matters alluded to (or emulsion), in saccharine (or other) liquids. In the second case, again, we may either (1) suppose that the state of change (analogous to combustion, fermentation, or putrefaction), being once set up by the influence of the actinic rays, does not at once cease when the iodide is withdrawn from their influence, but that it still continues for some time, the iodide or other body continuing also, as long as this lasts, to be the source of photographically-active wave-power, just as a burning body is of combustion-producing or stimulating rays; or else (2) we might suppose that the state of change (or what we might call the photographic fermentation) ceasing when the light is withdrawn, a certain portion of the wave-force or photographically-active influence generated while it was going on is still retained in some way by the iodide of silver—or it might even be by an indifferent body, like *the collodion itself or paper*—just in the same way as (though for a much longer period in proportion to the retaining mass than) the heat-rays, with their power of propagating combustion, are retained after its extinction, either by a burning body or by *other bodies* which have been in contact with it. The difference of time of retention cannot be considered much, against the probability of causal analogy (and an ordinary coal-fire will retain the power of igniting phosphorus for a very long time after all combustion has apparently ceased, also a block of stone after being made red-hot); and air may be almost infinitely less favourable to the *conduction* away of these actinic undulations than to that of heat. On either supposition, we may trace the same parallels, extending among photo-

than what is due to the usual impurities in the paper (and it may be, in the uranic salt) employed—so that we may employ a very weak ammonia-water, such as we run no risk of

graphic phenomena and those of nitrogenous ferments, to animal ferments, as pepsin and matter formed during disease, &c., and, we are strongly inclined to suspect, to those of snake-poisons,—all being noted for retention of their active properties when carefully kept. The superior sensibility of the daguerreotype and collodion films have long appeared rather anomalous, and particularly the injury to the sensitiveness of the latter caused by the introduction of easily-oxidizable vegetable substances. Might this apparent anomaly be accounted for either by their using up (so to speak) the wave-powers produced during the actinization of the iodide, without having the power of regenerating the same during their cremacausis, or by their modifying the action or state of change of the iodide, so as to alter the nature and diminish the photographic power of the produced waves, just as a lime-ball modifies the ray-powers emitted by the oxyhydrogen flame, *or as strontia salts modify a candle or spirit-lamp's flame*,—ordinary fermentation being also often exceedingly modified in its nature by the addition of other bodies to that fermenting?] 6. The phenomena commonly named catalytic, as the aid to solution in sulphuric or nitric acid, afforded to platinum or silver by the presence of silver or iron (so closely resembling that of wood to anthracite), and, I doubt not, the power (so opposed to what its chemical nature would lead us to expect) exhibited by oxygenized water, itself always at ordinary temperatures in a state of change, of communicating its state of deoxidation to metallic oxides, &c. How strictly analogous to the action of burning bodies, although in the opposite direction! *N.B.* This action of hydric oxide would suggest for consideration the possibility of its having been produced during the process of actinization of iodide of silver by the iodine (consequent on ozonization) uniting with part of the hydrogen in the water contained in the film, and consequently leaving a double proportion in union with the remainder. Nothing would more conveniently account for the anomaly already noted with regard to organic *acids* and oxidizable substances in the film than this, as their presence would *destroy* at once *as formed*, and so prevent the *retention*, or else prevent the *formation* of this binoxide of hydrogen. The power possessed by binoxide of hydrogen of reducing oxide of silver is no conjecture, but ascertained matter of fact; and though the nitrate is said, under some circumstances, to decompose it without undergoing decomposition itself, still we have in our collodion development the presence of other matters likely or certain to alter that. The statement of Thénard (as given by Gmelin), that white of egg exerts no decomposing action on the binoxide of hydrogen, is interesting in connexion with its use in the albumen process. However, a very great difficulty of such an hypothesis in connexion with binoxide of hydrogen would be the supposing it to remain in the film along with hydriodic acid without mutual decomposition. We may also recollect the possibility of iodine taking hydrogen from the alcohol existing in collodion, and also of this hydriodic acid being a reducing agent, though it is not by any means necessary to depend on this action of it, on the fermentation hypothesis.

As to ozone (including Oβ, Iβ, Brβ, and Cl$_1\beta$), we must not forget that, though commonly regarded as strongly promotive of oxidation, it may still, by initiating a combustion or cremacausis in organic matters present, be the promoter or stimulant of change in the reverse direction in the silver-salts associated with them; so that here, as in the case of the different actions of hydric oxide, the apparent paradox is capable of simple explanation.

The power of the sun's rays to impart oxidating and bleaching properties to ether, &c., has been attributed to union with ozone, but, if not an action in the reverse direction, might be considered, and most probably is, simply this, that they are set into a state of slow cremacausis, which they have the power of propagating to other bodies brought into contact with them or which give them the power of acting as reducing agents. I have found the same property in resins and oils long ago.

Class II. Comprehending phenomena of, 1, combustion-propagation *immediately*, by heat-waves radiated by burning bodies at a distance; 2, ordinary infection (if not by communication, by changing organic matter in suspension in the air); 3, photographic phenomena observable occasionally in developing photographs, where several are in one dish, though apparently not in absolute contact, one paper imprinting its image on another paper apparently by *radiation* or conduction of the wave-force given off *during* the state of change, just as one body is set on fire by another which is burning. (The nearer the two are, not only the stronger but the sharper is, and should be, the impression.)

Class III. Comprehending phenomena of the carriage and transference from one body to another of the change-producing or inciting force by a third body which is not apparently itself thrown into a similar state of change, exhibited, 1st, by carriage of heat, say, in the setting fire to wood or other combustible by a red-hot poker, or stone, or other incombustible; 2nd, in those cases of conveyed, infection a belief in which has dictated so many sanitary regulations as to quarantine, and the prohibitions to import certain articles of merchandise from countries where infectious disease prevails (unless those reputed carriers being mostly porous bodies may be taken to indicate absorption of matter in a state of change); 3rd, we have some of the phenomena discovered by M. Möser of Königsberg, and by Mr. R. Hunt, and the developable images which I found (and showed specimens of in 1855) to be produced by placing uranic and ferric papers in contact with prints, which had been exposed to the light, and to be also attainable by bringing a mixture of silver-salts with gallic acid or other reducer into contact with an actinized apparently neutral body; also the experiments of M. N. de St. Victor, with air in a tube, if they should turn out to have been correctly observed and stated. As originally described by M. N. de St. Victor, I was certainly inclined to admit them to be the experimental demonstration of that absorption of actinism naturally to be expected in the case of air, and to which, as to be expected from theoretical considerations and analogies, I had previously given a place in my climatic theorizations, though the *amount* of the photographic results obtained was certainly greater than I should have at all anticipated. Some of the tin-tube experiments more recently recorded would, however, point in other directions, *e.g.* to the *wave-powers* or other influences disengaged during the condensation or evaporation of water having some connexion with the phenomena.

Class IV. The phenomena of odours, to a great extent, and probably entirely. Baron Liebig has, many years ago, pointed out the fact that many substances well-known for their powerful odours, as musk, turpentine, essential oils, &c., are in a constant state of oxidation, and that those metals known for their un-

injuring the prints with; while, with an ordinary silver print on chloride-salted paper, the quantity of silver-chloride is so large, that, a weak ammonia-water taking up very little at a time, there is a temptation to use it of a strength apt both to materially weaken and to injure the tone of the print, though (if we wish, for protection, to lay on a very thick coating of gold or platinum) the redness produced by ammonia might even be intentionally sought, to balance against the too bluish tone of the gold*. Much may no doubt be done to prevent this, by a thorough toning with gold or platinum after a preliminary washing in water, or *weak* ammonia-water, to remove the free nitrate. It has often, however, occurred to me that the failures in ammonia-fixing, on the part of our practical photographers, might probably be, in some considerable measure, due to their having (not, perhaps, unnaturally), attempted to carry out the system of manipulation and application of the fixing agent employed (and properly employed) when using hyposulphite, to the case of ammonia-fixing also. The difference is simply this: with hypo. our object in the first instance is to convert the silver at once into a salt freely soluble in water, the double hyposulphite of silver oxide and soda. This we afterwards dissolve at our leisure with pure water. With ammonia, on the other hand, it would be impossible, except with a bath strong enough to act most injuriously on the picture, to convert the entire of the silver chloride into a soluble form at one blow; and even if accomplished, it seems probable that an after-immersion of the print in pure water might cause a considerable reprecipitation in the paper. The proper system for the fixation of the ordinary papers† with ammonia would therefore seem to be the employment of a very *large number, in succession, of very weak* ammonia baths, each of them dissolving out and carrying away with it a certain amount of the chloride, and the gradual diminution of the strength of these baths towards the concluding one, which may be plain water; or we might arrange so that the prints should be subjected for a considerable length of time to a current of very weak ammonia-water, made just strong enough to have a perceptible smell when close to the nose (testing the prints or the water occasionally with sulphate of iron, or other deoxidizing solution, for the presence of silver). It is obvious that, for ammonia-fixing, it is desirable to reduce the quantity of chloride used in salting as far as may be, or to do away with it altogether, if possible. As to other fixing agents for positives, I confess I should like to know whether an exceedingly weak solution of cyanide of potassium has been *sufficiently* tried, and found decidedly unavailable. If it has not, one would be inclined to expect that it might be used with advantage to development-prints particularly, if salted with bromides or iodides, or mixtures containing them, as our print would *then* have exactly the composition of an ordinary negative, to which it appears that the cyanide of potassium may be applied with safety. Ferrocyanide of potassium was used by Sir J. Herschel, but given up, as Mr. Hunt tells us, on account of its remaining in the paper. It may be, however, that it is deserving of a further trial (also the ferridcyanide or red prussiate), particularly *with an after-washing with weak ammonia* to dissolve out the *ferrocyanide* or the ferridcyanide of silver when it is once formed; and ferridcyanide would require to be used in very weak solution, otherwise it dissolves away the picture. Experiments made by me seem to indicate that something may be attained in this direction,—the ferrocyanide (or ferridcyanide) corresponding, as far as manipulation and rationale (only being very careful as to strength), to the hypo. in ordinary fixing, and the ammonia-water here corresponding also to the

pleasant odours when touched, as tin, copper, arsenic, &c., are invariably such as are subject to atmospheric oxidation. Does not all this point to the possibility of the sense of smell, like those of hearing and sight, being also due to vibratory or undulatory motion? But we must not enlarge on this tempting subject here, further than to remark that we think we can trace the same chain in the phenomena of *taste*, as also in the medicinal or poisonous actions of, at all events, all those substances which do not act chemically or corrosively on the animal or vegetable system. With regard to smells, I must call attention to the peculiar and far from agreeable odour emitted by the actinized uranic papers in some circumstances (as when ferridcyanically developed), and suggest the possible connexion of some wave-power, "imponderable," ozonoidally modified element or compound or other influence like that here emitted in some of the tin-tube experiments.

* Has it been ascertained that the gold is *always* laid on so as to cover every part, particularly in slight toning? If not, galvanic action might make such slight toning quite the reverse of a protection to the print.

† I am, from theory as well as experiment, much inclined to doubt the possibility of *successfully* fixing the ordinary prints on albuminized paper with ammonia. It is not unnatural to expect that the albuminate of silver should be insoluble in any strength of ammonia-water not also sufficient to exercise a solvent influence on the entire film of albumen. With silver-developed ferric and uranic prints, however, I have certainly in some instances apparently succeeded; but *in these cases* the albuminate of silver, formed by the developing bath, may not have had time to get into a thoroughly insoluble condition before the application of the fixing agent; and many salts easily soluble before drying are with difficulty so afterwards; besides, I am not sure but that I used an ammoniacal developer, which would prevent its precipitation. My inclination is to confine the use of albumen (unless in small quantity), except in the case of very small and stereoscopic pictures, to development processes.

pure water used in hypo.-fixing, and the entire fixing consisting in either case of two stages—the first being to convert the chloride, bromide, or iodide into another salt soluble in a certain fluid (pure water or ammonia-water, as the case may be), and the second stage being to wash out with the solvent fluid*.

With regard to hypo.-fixing and the difficulty of getting rid of the last dregs of the hypo., leaving out of the question for the present the subject of mechanical aids to washing, we would remark that we made, some months ago, some experiments with the view of finding some substance which would destroy, by oxidation of the hyposulphurous acid, any portion of the salt which might be left. Permanganate of potash got a trial, though the deposit of oxide was an obvious objection. Still it is quite possible to remove this by binoxalate of ammonia or other solvent. An exceedingly dilute solution of chloride of lime, or of chloride (or hypochlorite) of soda†, appeared to offer perhaps the best chance of answering the desired end. Exceedingly weak they must both be, if we do not want to injure both paper and picture; but used carefully, and sufficiently dilute, both they and also chloric acid, or a mixture of sulphuric (or muriatic) acid with solution of chlorate of potash or of baryta, seem to merit further trial (also, perhaps, peroxide of hydrogen). Calling the attention of those who take an interest in such speculations to the considerations connected with the analogy between photographic action and the phenomena of fermentation (which, as less interesting to the majority of readers, I have put into a note), I will proceed to give a few of what appear to me to be good printing-formulæ.

During my early experiments in the silver-development of the uranium salts, being much struck with the good colour obtained when working with the tartrate and some of the other vegetable acids' salts, and finding also, on reference to Mr. Hunt's 'Researches' (that invaluable repository of observations), that he had got good colour on paper prepared with tartrate of silver, but that the printing was far too slow, I was induced to make some experiments to ascertain whether, by combining it with the chloride or bromide, or both together, we might not get, at once, the rapidity due to the one salt and the colour given by the other.

* For those who must have a formula, say, water, 80 oz., and yellow prussiate of potash, 600 grs., followed by ammonia-water simply odoriferous.

† We are informed by a friend that the strong solution, under the name of "Eau de Jauvelle," is used in France for purifying porcelain baths, or hyposulphite from the hands.

The result of these experiments enabled me to recommend a paper salted with this mixture, and sensitized in the ordinary way, as capable of yielding good colours even without any toning bath (see report of Paper read before the Scottish Photographic Society, in 'Photographic Notes' of March or April 1857). The proportions I found work well were as follows, estimating them, say, for an 8- or 10-oz. bath:—

90 grains chloride of ammonium,
50 grains tartrate of ammonia.

Trying various of the other vegetable salts—as the oxalates, succinates, formiates, earbonates, acetates, racemates, citrates, and meconates*—as substitutes for the tartrates, and with good success, though with variations as to rapidity and tone, I found the following a very good salting-solution, giving *great* rapidity and good tone:—

90 grains chloride of ammonium,
50 grains benzoate of soda;
or
90 grains chloride of ammonium,
20 grains benzoate of soda,
25 grains tartrate or oxalate of ammonia;

sensitizing with plain nitrate of silver bath, 70–80 grains to the ounce, or with ammonia-nitrate bath. But considering the great and ready solubility of the silver-salts of the vegetable acids in ammonia, I found a better mode of introducing their action, combined with that of an ammoniacal bath, to be as already described,—to salt with chloride or chloride and bromide alone, introducing the vegetable acid rather into the *sensitizing* bath, either as a neutral salt or, still better, according to the following formulæ:—

Citric ammonia-nitrate bath.—Make two solutions,—one a common ammonia-nitrate bath, 80 grains to the ounce of water, and the other a *saturated* solution of citric (or tartaric) acid. Solution No. 1 being in a large stoppered bottle, with plenty of room to spare, drop solution 2 into it, shaking after every little addition, till the white precipitate which has been formed is redissolved, and continuing this alternate addition of citric acid and shaking (and it requires pretty active shaking towards the conclusion, as well as cautious dropping, to avoid excess of acid) as long as the liquid continues to redissolve the precipitate. When this ceases, add no more, but filter or pour off from any remaining precipitate. Float your

* There are peculiarities, however, attached to the meconates, bringing them into alliance with the tannates and gallates in their action. Meconic acid should have a trial in negative processes, and in the development

papers on this bath, and add more silver and, it may be, a little more acid, occasionally as required.

Benzoic ammonia-nitrate bath.—Make a common ammonia-nitrate bath, and add to it crystals of benzoic acid, leaving them in the bath till dissolved, and adding more as long as they are dissolved.

N.B. The solution of them is very slow; and I left them some days in the solution.

While calling attention to the perfect possibility of obtaining good tones by the aid of the vegetable salts, even without having recourse to any toning bath, I have still never been inclined to undervalue the probable advantage of gold as a protection to our prints when properly applied. On the contrary, I have bestowed much attention on both gold- and platinum-toning; and it is now more than two years since I have made a point of recommending to my photographic friends the use of an alkaline gold bath, formed by adding an alkali (most conveniently and preferably, from its not corroding the paper) as an alkaline carbonate to the chloride-of-gold solution,—the ground of my recommendation being this, that the chloride of gold used is a terchloride, containing three atoms of chlorine to one of gold, and that consequently (chloride of silver containing an equal number of atoms of silver and chlorine), for every atom of gold deposited by the bath on the picture, we have three atoms of the silver of the picture abstracted, while, by calling in the aid of the alkali, existing either in the state of carbonate or, as I believe and have stated in my published papers, to some extent in the condition of an alkaline aurate or combination of alkali with auric oxide or teroxide of gold, we enable the exchange of the two metals to be conducted on something more like fair terms, and equalize or nearly equalize matters. What I chiefly recommended was common washing-soda or bicarbonate as the most accessible salts, ammonium having this disadvantage, that, except where there is much free acid or chloride of ammonium already existing in the gold-solution, and a great excess of ammonia is added, much of the gold is apt to be precipitated. I have therefore not recommended the use of it, except to those who are working, at any rate, with a gold-salt made with muriate of ammonia and nitric acid; and even they, I believe, had better discard it and use the pure terchloride, and soda or potash carbonate. Without entertaining the smallest doubt as to others having separately come to the same conclusion as to the advantage of alkalinity in the gold bath, I may at the same time state that, as far as I can hear, my recommendation of its use has been the earliest one; and if as yet* unsuccessful in bringing it into use, that is hardly my fault, as I have been sufficiently explicit to my friends here, both as to the theory of the advantage to be obtained, and also as to the simplicity of its attainability, by the mere addition of a salt to be obtained at any grocer's or druggist's shop.

As to the addition of a citrate†, we owe that, of course, entirely to Mr. Hardwich; for, though I used formic and oxalic acids and some other substances as additions to alkaline gold solutions in some of my attempts at direct gold-printing, as well as, in passing, in the chrysotype developments, and though I find the addition of tartaric acid, &c. of great use in platinum alkaline baths, yet in gold-toning my alkaline bath was plain gold chloride and carbonate of soda or potash alone, and my directions were simply to make an ordinary good strong terchloride-of-gold bath, and then, first, add carbonate of soda till neutral to test-paper, and then as much more again, or a still further excess, particularly if intended for albuminized prints.

As to platinum-toning, in addition to the same difficulty as that attending the use of the *ter*chloride (the platinum-salt being, however, only a *bi*chloride, and therefore, so far, not quite so bad‡), we have the following additional difficulties:—1, the *much* greater affinity of platinum than gold for chlorine; 2, the very great tendency which the platinic chloride has to form an insoluble double salt with platinum and silver together with chlorine; 3, the tendency also to form insoluble salts with potash and ammonia, particularly the former, when used in paper-salting, rendering the sodium salts most suitable, and potassium least so, for salting prints intended for bichloride-of-platinum toning.

The following is a good formula for a platinum-toned uranium print:—

Sensitize with—

Nitrate of uranium ..	100–150 grs.
Water	1 oz.

* The objections of some of my practical friends were, first, that their gold-salt, being made with muriate of ammonia, must already be alkaline, and too alkaline, as they found the addition of a little more muriatic acid to the bath, "to diminish the alkalinity," an advantage. It was in vain to tell them that muriate of ammonia was not ammonia, or alkali, any more than it was acid, and that the salt obtained was still nothing other or better than the combination of *ter*chloride of gold with chloride of ammonium.

† Probably producing either an *alkaline aurite* or a citrate of aurous oxide in the bath.

‡ The much lower equivalent and the higher specific gravity telling, however, against platinum, and probably more than making up this difference.

Develope with—

Nitrate of silver	30 grs.
Water	1 oz.

or the same converted into an ammonia-nitrate bath*. Wash, after development, first with plain water, and then with water slightly acidulated with bitartrate of potash (*i. e.* cream of tartar) or citric acid.

To prepare the toning bath, take common dry bichloride of platinum $\frac{1}{8}$th of an oz. (value about 3*s.*), dissolve it in $\frac{1}{4}$ oz. of water, and make and *drop* into it a saturated or pretty strong solution of acetate, tartrate, or formiate of potash, as long as any precipitate continues to be thrown down. Let it subside thoroughly, and pour off the clear liquid, which may be neutralized with carbonate of ammonia or potash†, and then used for making up the toning bath, just as common gold chloride is, or with the further addition, *in the bath*, of enough carbonate of soda or ammonia to render it strongly alkaline (heating, if you please, to favour the formation of platinate or platinite of soda). Or another and, I think, a *better* plan of securing the advantages of the presence of tartaric or other vegetable acid is this:—First precipitate with *sulphate* or nitrate of potash, so as to get a solution of *sulphate* or nitrate of platinum, which will keep without change for any length of time; and then add to it the *tartrate of ammonia* or of potash, or formiate of soda, or oxalate of ammonia, *just when* you are going to use it, and only to the quantity you are going to use in making up your toning bath, which bath, as the others, may be made either simply neutral or else as strongly alkaline as is wished, and may be also used without or with a previous heating, to promote protoxidization of the platinum.

The same toning-bath formula is equally applicable for the platinum-toning of ordinary prints.

For printing by the neutral-tint uranotype, the following is a very good formula:—Steep the paper in, or float (if albuminized) on

Nitrate of uranium ..	200–250 grs.
Water	1 oz.

Expose till the impression is distinct, even in details, though faint, then wash well with the aid of a sponge or a flannel-covered roller till the paper is clear and the uranic salt dissolved out of the lights. This *is not at all a tedious* washing, much less so than in the ink processes, and may be performed sufficiently well in a *very* few* minutes, even on thick paper.

N.B.—The first water in which the print is put should be preserved for the recovery of the uranium by evaporation or by precipitation, by an alkali or alkaline carbonate; and the rest of the washing may be either in successive baths or in a stream of water, dabbing well with the sponge or rolling with the roller.

Develope with—

Red prussiate of potash	20 grs.
Water	1 oz.

washing well again with sponge to get rid of red prussiate. *This* washing must be very careful, or the lights would be blue after toning. I have used and recommended a little citric acid or bitartrate of potash in one of these latter waters, in order to get rid of the precipitated yellow uranic oxide or uranate of potash, though it is not necessary for that, if we use the larger quantity named in the toning-bath; still it is to be recommended as aiding in the quick removal of the red prussiate. The toning-bath consists of

Sulphate of iron	$\frac{1}{4}$ to $\frac{1}{2}$ gr.
Citric acid	$\frac{1}{2}$ gr. to 5 grs.
Water	1 oz.

Finally, wash in water and dry. This process is capable of giving, according to time in the toning-bath, almost any desirable depth or variety of tone which is obtained by silver, and is apparently (as far as facility and quickness of the washing and the results obtainable, and the ease with which they are attainable) one of the best of the processes without silver which have yet been published†. It must be

* Or use our citric ammonia-nitrate bath, diluted to the proper strength with water.

† There are many, *in some respects*, better modes of obtaining a platinic salt (*i. e.* other than the bichloride) than this one, which I have, however, preferred to give as *by far* the most easily and readily managed by the ordinary photographer, no great chemist, and without many chemical appliances. Two-thirds of the platinum being thrown down in the precipitate (in combination with the chlorine and potash), this *must* be preserved for future reduction of the platina from it; and if this is done, there need be no loss of the metal, and the process is certainly, *with the materials commonly attainable*, by far the simplest and easiest. Tartrate of potash for precipitation is obtained by saturating common tartaric acid with bicarbonate of potash; acetate and formiate in the same way with their respective acids. If in request, sulphate of platin*ic* oxide would be kept ready made by the photographic chemists, as might also be the platin*ous* sulphate.

* I am, however, not sure but that water which has been boiled or heated to expel the air has some advantage in not peroxidizing the image so quickly; and the addition of a few drops of alcohol or wood-spirit might be also useful in preventing peroxidization: these prints, after washing, become alternately deoxidized and peroxidized in the light and the dark, changing colour.

† Though in rapidity of printing it falls considerably short of some of the chromic processes, particularly when they have the advantage of the presence of oxalic acid or oxalates, or other vegetable acid, of which I have recommended the addition to them. As to facts connected with permanence, I can only refer to prints of March 1855, as exhibited in the Suffolk Street Exhibition now or lately open. Alkalies and their carbonates certainly destroy them at once; but as they may

particularly noted that the action of the toning bath must be attentively watched, and the print removed from it *very considerably before* the attainment of the ultimate tone or degree of blackness desired; otherwise it will be found to have been materially overtoned when dry—possibly turned quite blue if left even two or three minutes too long*.

As variations in uranium printing, we may use a proportionably strong solution of the *acid* oxalate of uranium formed by dissolving uranic oxide (or, better, precipitated neutral uranic oxalate) in a solution of oxalic acid. The iron may also be introduced at the commencement of the sensitizing in the shape of a few drops more or less (but more than when used in toning is borne) of ferric nitrate solution, or ferric-ammonia-oxalate, or acid ferric oxalate; or these latter salts, or iron alum, or other ferric salt may be made to replace the ferrous sulphate in the toning bath just given. I have tried also cobalt, nickel, and gold, silver, platinum, copper, and various other metals, not only in combination with the uranium, but also in toning-baths, but in general without such success as to induce me to bring them forward prominently here†.

I have in my older papers called attention to the fact that the uranium processes (with both the ferridcyanic and the metallic developments) work perfectly well on *albumen or glass*, as well as on albuminized paper.

I need hardly give a separate formula for use in negative-taking on albuminized plates, as the management is so nearly alike‡. On collodion plates—owing, no doubt, to the absence of *readily*-oxidizable organic matter—the action is *desperately tedious*, unless we make use of the ammonia-oxalate or acid oxalate solution, or of certain other salts, instead of the nitrate; but this paper being on *printing*, we must leave negative processes for another occasion. I should have mentioned that the washing out before development may be, of course, practised equally in the case of the silver developments (and with possibly, at least to some extent, an advantage, in not letting so much uranium mix with our developing solution, though, when we use an ammonia-nitrate developer, it is mostly precipitated on the paper) as well as with the gold and *palladium* developments.

Cuprotype Process.—Dissolve 200 grs. or upwards* of pure precipitated chromate of copper in as *little* of the *concentrated* solution of chromic acid as can be made to take it up. Dilute to 1 oz. measure with water†. Sensitize your paper (plain or albuminized) by floating (or steeping) for five to ten minutes, and dry in the dark.

Expose till the picture is distinctly visible in its details, *but stopping before there is any darkening of the colour of the paper in the high lights.* The exact time of exposure must necessarily be a matter for judgment acquired by experience, and cannot be otherwise learnt or taught.

Wash as in the neutral-tint uranotype process; but *far* more washing is requisite. All yellow must be thoroughly washed out of the lights; and then we must give a *still further washing*, as what might be *quite* invisible as *yellow* chromate of copper would be quite destructive of the lights when darkened by the developing and toning baths. Both here and also in the uranotype, in washing out, I prefer warm water—say, blood-heat there, and considerably upwards here. Develope in a solution of yellow prussiate of potash 50 to 100 grs. per oz.; or first subject to the action of a weak bath of carbonate of soda or caustic soda, and then immerse in the yellow-prussiate bath, acidulated in this case with a little citric, tartaric, or other acid. [A solution of arsenious acid (arsenic) may be employed to produce a green print, or, along with the ferrocyanide,

be kept out of contact with them, this becomes rather a convenience to the printer than anything else, as enabling him or her to keep the hands clean without cyanide of potassium or anything more formidable than ordinary soap and water.

* It is to prevent this, and diminish risk of inequality of toning, that I recommend *so very weak* an iron bath. The great preventative of unequal toning is, however, equal washing, *or all parts of the paper* being reduced to an *equal degree of penetrability* to fluids; and it is for this reason that I prefer the roller (giving *equal* pressure, as it does, to the *whole* print) to any other assistant in washing.

† We may also get brown or black prints by sensitizing our papers with a mixture of ferridcyanide of potassium and uranic tartrate or nitrate, toning afterwards with iron, or even introducing the iron in the sensitizing of the paper.

‡ Only, of course, using a *strong* solution, and sensitizing by immersion or dipping, and, in the case of the *silver*, palladium, and *gold* developments, calling in the aid of a weak iron-bath, so as to make a shorter exposure in the camera answer; or an acidulated solution of gallic acid, tannic or pyrogallic acid may be used. See my paper in the 'Liverpool Photographic Journal' of last spring and summer.

* According to the class of negative to be printed from (just as the proportion of silver is varied by judicious printers in the common processes). I may state, however, that my impression is that better results would have been got by a stronger solution than I used for my specimens lately in the Suffolk Street Exhibition.

† If greater sensitiveness of the paper is wished, add oxalate of ammonia or oxalic acid (or citric acid) from 30 or 40 grs. upwards, though oxalate of ammonia rather interferes with the use of albuminized papers. Grape-sugar or gum, &c., may be also added here as well as to the uranic solution, particularly to the nitrate.

a neutral-tint one.] The development often takes some hours to complete*. Wash again very carefully with warm water, to extract all the prussiate of potash from the lights (the water may with advantage contain a little citric or other acid, or *bitartrate of potash*), and tone with the same iron-bath as is given for the neutral-tint uranotype, and with the same precautions against over-toning, and then wash finally in water, and dry. Or tone with a uranium-bath containing, say 10 to 20 grs. of uranic nitrate to 1 oz. of water: we thus get a brown uranium print which may again be further toned to any extent of darkness by our iron toning-bath.

Sulphide of Cobalt Printing Process.—This is the best of a great many attempts to make the dark metallic sulphides available, and the one whose results seemed most likely to be durable (if any are). Dissolve 200 grs. or upwards of carbonate or oxide of cobalt in strong chromic acid solution, diluting afterwards with water to 1 oz. by measure. Sensitize as in the cuprotype, and wash in the same way. Develope with a weak solution of hydrosulphuret of ammonia, or else sulphuret of potassium†; wash again and dry.

The uranic neutral-tint processes and the cuprotype process (as well as, of course, their intermediate untoned stages) are also suited for printing on silks, calico, linen, and other textile fabrics, and for processes such as the cuprotype and the various ink processes, and other processes with the bichromate and chromate, which require much washing to secure clear lights: these fabrics possess very great advantage from the INFINITELY less delicacy of handling necessary. The caustic alkaline solutions, or chloride of lime or of soda solutions, which I have recommended in some of my processes with manganese, &c., may here be employed without the same risk of destroying the texture, which almost prevents their application (in any strength, at least) to paper. I am not aware whether photographers are cognizant of the fact, that on ordinary fine white silk, by salting, sensitizing, and toning just in the ordinary way, *without requiring or using any peculiar formula whatever*, the most beautiful results are readily obtainable. Such prints in lustre and richness of effect are decidedly superior to paper prints; and if a fine texture of silk is employed, there is no want of delicacy or minuteness perceptible,—at all events at the ordinary distances at which we are in the habit of looking at photographs. For prints of a large size, especially intended for framing, I would most earnestly call the attention of photographers to its great advantages; and there is, or need be, no difficulty in getting silk large enough even for the large Italian or Roman views which are produced, or even much larger, whereas it is very difficult to get paper of a good quality of these *very* large sizes.

Cotton fabrics may be either steeped or floated, particularly if previously albuminized or soaked in a *very weak* solution of *wax*, gutta-percha, or resin, in alcohol, or turpentine, or naphtha, to diminish the penetrability to water, and keep the picture on the surface. Manufacturers could no doubt produce such fabrics of much finer texture, if in request; but even at present, *cotton* and linen photographs, though wanting the delicacy of those on silk, might, from the immense saving of labour in their preparation, in washing, and also elsewhere, if we sensitize by steeping, prove useful in many cases. In photographs on a large scale, for instance, intended to be hung up, as so many paintings are, at a considerable distance above the eye-level, and looked at from some distance, the want of delicacy would *never* be perceived or felt; and to get negatives to print these pictures from, we have nothing more to do than to enlarge, say from wax-paper negatives of a quarter of the size of the picture wished, or collodion or albumen negatives of, it may be, a very much smaller size, without losing any amount of delicacy in detail which would in this case ever be missed, or could be seen at such distances. In maps and plans also, and for drawings for illustration of public lectures, such a system would be most valuable,—the less expensive cotton materials in most cases answering every purpose, particularly if albuminized or glazed; and such maps might be very convenient for the traveller. The application, even after printing, of a little gum, varnish, or albumen would render the protection with glass of such pictures when hung less necessary; and, should they get at all soiled or dusty, we have only

* The print *must not* be taken out *before* it is complete. The colour is then a pinkish or purplish brown, and the print a very tolerably distinct and *strong* one, *very different* from what it was before the immersion in the prussiate bath. I have on more than one occasion found large numbers of spiders poisoned in this bath. The poisoning may be owing to the yellow prussiate, or more probably to the copper taken up by it; but the great mystery is, what on earth induced them to perpetrate suicide.

† For other forms and other modes of introducing the copper or cobalt in these printing processes, I would refer to my papers and letters in the 'Photographic Notes' of 1857, and 'Liverpool Journal.' It is perfectly possible in the cuprotype as in the uranium process to introduce the iron at the commencement, in the form of "iron-alum," ammonia-ferric oxalate, or other ferric salt, or a ferric oxide, as I pointed out in two papers in the 'Journal.'

to wash with a little soap and water in the case of the silver prints (or plain water in the case of some of the others), and they will be as good as ever.

The Fothergill Process.

To the Editor of the Photographic Journal.

May 7th, 1859.

SIR,—When I commented upon Mr. Keene's experiments and inferences, as published in your Journal (and signed my name), I imagined I was pursuing a frank, honest, and straightforward path, and one open to any of your readers.

Of course it is not a matter of the slightest moment to *me*, whether Mr. Keene affects to consider my remarks as a personal attack, or whether he adopts the more manly conduct either of defending his former assertions or candidly acknowledging the justness of my refutations.

Perhaps I may add that I was induced (solely by the letters signed 'A. Keene') to state that, in my opinion, the theory of the chemistry of the Fothergill Process, as there propounded, was simply "erroneous."

This I now reiterate.

I also asked, with an inquiring spirit, if the quantities so specifically mentioned by that gentleman were the *sine quâ non* proportions for the delightful "certainty" so kindly promised.

If my remarks were not couched in sufficiently reverential language, it was because I thought Mr. Keene's letters partook rather too much of the feeling (so aptly expressed by Mrs. Poyser) of "the cock who thought the sun got up to hear him crow."

> "Thus, gentle readers, I have let you ken
> My very thoughts, from heart to pen."

JAMES BALY.

The Archer Fund.

To the Editor of the Photographic Journal.

June 6th, 1859.

SIR,—The pitiful amount collected for the widow and orphans of the late William Archer, as appears from the accounts published in your last Number, has to me produced much disappointment.

But an amateur myself in the photographic art, the practice of it, though a source of much pleasure, has to me been by no means one of profit; but, on the contrary, involved the expenditure of large sums of money in the purchase of instruments and materials.

I have not failed, however, to acknowledge the claim which the widow and orphans of the enthusiastic inventor of the collodion process have upon my gratitude, not to say upon my charity.

It is with pain, however, I perceive that some men who have made, and are making, hundreds and thousands of pounds by Mr. Archer's invention, have not contributed one farthing to the fund for his bereaved family.

Such illiberality must, to my mind, extend to their commercial transactions; and without wishing to be exclusive in my dealing, I for one shall, in self-defence, take care that, for the future, my custom shall be extended to those alone who give better proof of their liberality in a tangible form. And if others, too, act on this principle, we may perhaps teach those gentlemen that liberality and interest may sometimes be united.

PHILO-SAGITTARIUS.

PS. I know none of the parties connected with getting up the subscription list, but perhaps they are still open to receive additional subscriptions.

⁂ It is intended in the next Number of the Journal to insert an additional list of Subscribers, whose contributions have been received since our last Number was published; and we trust that the appeal from our correspondent will be liberally responded to.

Defects in Fothergill's Process.

To the Editor of the Photographic Journal.

Sandbach, Cheshire, June 8th.

DEAR SIR,—Will you, out of pure charity, kindly tell me the cause of, or how to obviate, a defect I find very common in my negatives by the Fothergill process; the only one indeed that prevents my obtaining perfect results by that process.

It is the occurrence, chiefly in the skies, but also occasionally in other parts of the picture, of *striæ* of all shapes and forms,—sometimes very like (on a minute scale) what are called, in silks and other fabrics, "*water-markings*," at others patches, of varying length and breadth, of fine parallel lines, sometimes straight, sometimes assuming a variety of convolutions, and either ending abruptly, or shading off gradually into the proper shade of the film.

I am sorry I have no print I can send you to help out my description; but you will perhaps understand what it is I complain of, without. I have tried to obviate it in every way I can think of; but it is still my *bête noire* in many of my best negatives. It can be from no deficiency in washing the plates after the albumen; for this I do very thoroughly, and I also allow ample time and water for washing the plate after coming out of the silver bath.

Thinking the cause might be in the mode of developing, I have tried the minutest quantity of silver to commence the development with. The only thing I can now think of, that I have not tried, is using thinner albumen—that recommended by Mr. Keene (whose directions, I should say, I at first strictly followed; afterwards those of Ackland, but with Keene's collodion *neutral* bath and strength of albumen); for I have a strong suspicion that the defect lies in a want of uniformity in the action of the albumen on the silver. If you can help with advice or instruction in this matter, I shall feel very much obliged.

W. C. J.

[We have seen these defects arise from the albumen not being evenly applied over the collodion surface. If a thicker portion of albumen remains at one spot than another, marks are very apt to occur; and great nicety we have found to be needful at this period of the process. Lately we saw a number of plates destroyed by being put up to dry on a dirty shelf, when, by capillary attraction, the small particles of dust had ascended to near the tops of the plates.—Ed.]

Photographic Defects.

To the Editor of the Photographic Journal.

Staplehurst, June 6, 1859.

Sir,—There is a defect by no means uncommon, especially in the Fothergill process: viz. that where a dark is immediately against a light, the light will be overdone there.

The two pictures enclosed are spoiled from over-printing; but on that account they explain my meaning better. You will see a white rim round the coachman's hat in the one; in the other you will see it in the sun-blinds, in the sky, and all through the picture. Can you explain the cause of this? Do you think any modification of the developer would be likely to obviate it?

I have not yet succeeded in getting strictly instantaneous dry plates, though very nearly. I am disappointed that the matter has not been more generally taken up. In the February Number there is an allusion to an instantaneous dry picture by Mr. Kibble. Has this gentleman not published his process? If not, will he not?

Lastly, I want to suggest that it would be a great relief to dry photographers, if, when they visit the Continent, they were not necessitated to carry a yellow bag, solely for the use of custom-house officers; and I believe that by entering into communication with the societies of Paris and other places, bags could easily be provided as permanent fixtures at the custom-houses, and a list of those so provided might be published in the Journal, and photographers shape their tour accordingly.

J. M. S. B.

[The appearance similar to rays of light around a dark object, is by no means confined to the Fothergill process; we have seen pictures exhibit this, both in wet collodion and calotype; a landscape, having a distant hill, has frequently a fimbriated edge all along the margin near the sky, showing a sort of unnatural halo. We are not aware of the *true* cause being known, and shall be obliged for the experience of any of our Correspondents on the subject.

ANSWERS TO CORRESPONDENTS.

Gentlemen desirous of admission into the Photographic Society, are requested to communicate with the Secretary, 1 New Coventry Street, Piccadilly, W.

To the Editor of the Photographic Journal.

Sir,—Can you inform me if iodized paper for the calotype will be good after two or three years, provided the surface is not discoloured?

Which is the best formula of all the paper-processes for an amateur? D. P.

1. Iodized paper, if properly prepared, keeps good for any length of time that at present it has been tested. Lately we used some which was prepared in the year 1844, and the results were quite satisfactory.

It has been found that, by an exposure to sunlight for four or five seconds before being sensitised, its action is much accelerated.

2. If you follow the instructions given at p. 129 of the first volume of this Journal, you will scarcely ever meet with a failure; if you do, it is from some neglect in your manipulation. A degree of definition may be obtained that is little inferior to collodion; it is as sensitive as most of the dry processes; and the whole apparatus, including chemicals for a month's tour, so portable and light, that you are independent of other aid than your own.

W. C., and some other correspondents, shall receive a private answer to their inquiries. Other replies in our next.

The present Number completes the fifth volume.

Title and Index in our next.

Letters of inquiry to the Editor can only be answered through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. Taylor and Francis, Red Lion Court, Fleet Street, E.C.

INDEX.

N.B.—A dash rule represents the *italics* immediately preceding it. When *d.* follows a person's name, it refers to a discussion in which he has taken part.

THE END OF THE FIFTH VOLUME.

PRINTED BY TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

THE

JOURNAL

OF

THE PHOTOGRAPHIC SOCIETY

OF

LONDON.

CONTAINING

THE TRANSACTIONS OF THE SOCIETY,

AND A

GENERAL RECORD OF PHOTOGRAPHIC ART AND SCIENCE.

EDITED BY

HUGH W. DIAMOND, M.D., F.S.A.

VOLUME THE SIXTH.

LONDON:

TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

1860.

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ALERE FLAMMAM.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 87. JULY 15, 1859.

THE ARCHER FUND.

We trust that the following note from Sir William Newton will remind our readers that they may still add their names to the list of subscribers, and with this view we have postponed the second amount of subscriptions until the issue of our August Number:—

"Sir William Newton requests the Editor of the Photographic Journal to state, in the next Number, that subscriptions to the Archer Fund are received by the Union Bank of London in Argyle Place, and also by himself as one of the Treasurers.

"6, Argyle Street,
July 9th, 1859."

Our photographic friends in Edinburgh contemplate again to distribute prizes for photographs, as well as for original communications to the Society; we beg, therefore, prominently to draw the attention of our readers to the advertisement in our present number, and to state that the Honorary Secretary, Mr. Kinnear, will be happy to personally give any further information on the subject which may be desired.

The exhibition of photographs at the meeting of the British Association for the Advancement of Science having met with so much encouragement at Leeds last year, it has been determined that a similar attraction shall accompany the Aberdeen Congress. The following circular will give contributors information on this subject:—

British Association.—Meeting in Aberdeen, under the Presidency of H.R.H. the Prince Consort.

107 King Street, Aberdeen,
7th July, 1859.

The Local Committee intend to have an Exhibition of Photographs during the Meeting of the British Association in Aberdeen, in September.

All descriptions of Photographs will be admitted, except coloured ones. Touched Positives or Prints from Touched Negatives must be described accordingly. It is strongly recommended that they be framed and glazed, with a margin of mounting-board not more than 2½ inches all round, and that those smaller than 9×7 inches be arranged four in one frame. They should be marked on the back with the names of the subject, the process (Collodion, Waxed Paper, &c.), the artist, and the owner.

A list of the Photographs should be enclosed in the case, and a duplicate list forwarded by post to the Honorary Secretary, 107 King Street, Aberdeen.

Facilities will also be given to the makers of Photographic Apparatus, &c., for the exhibition of such of their productions as may be considered of peculiar interest from excellence of construction or novelty of invention.

Contributions are requested to be sent in not later than the 1st of September, Carriage pre-paid, addressed to "The Photographic Exhibition, Music Hall Buildings, Aberdeen." At the close of the Exhibition they will be carefully repacked, and returned, free, to the owners.

John F. White,
Local Secretary.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communi-

cations. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

A MEETING of the above Society was held on the 20th ult., the President, J. GLAISHER, Esq., F.R.S., in the chair.

After the usual business had been transacted, Messrs. Henry Kent, Newton Crossland, Thomas Skaife, and William Kieser, were duly elected members of the Society.

Mr. Heisch exhibited two dry plates, one prepared by Dr. Hill Norris, the other by himself, by the metagelatine process; both had been kept so long that a dirty deposit formed during development. On the plate prepared by himself, this was entirely removed by gentle friction with a pad of wet cotton; on attempting to do the same with Dr. Norris's plate, the whole picture came off in powder. But the point to which he called the attention of the Society was this, that the glass was still entirely covered with a transparent film. This film resisted the action of a mixture of ether and alcohol, but was removed at once by hot water; it was apparently a coat of gelatine. The question is, does Dr. Norris coat his plates with gelatine before collodionizing, as has been lately so much recommended? or is his collodion so powdery as to let enough gelatine through to form this film? Mr. Heisch thought the former supposition much the most probable. He also exhibited one of Derogy's lenses, and the pictures taken with it, which were of the most satisfactory description.

Mr. T. R. Wheeler delivered a short paper upon Monkhoven's Cellulose process, as recently employed by him, and exhibited a picture taken by it, as well as some prints from that picture. He adverted to the discovery of Schweitzer, of Zurich, that cotton and silk were soluble in cupro-ammonium, and to that of Pelouze as to the solubility of cotton in concentrated hydrochloric acid, and to the application of that discovery by Peligot, while Monkhoven of Ghent had collated what was previously known on the subject, so that the process was not unfairly named "Monkhoven's Process."

The author stated that the object of the several methods in which the ammoniacal solution of copper is employed is the same, viz. to obtain a solution of oxide of copper in ammonia. Monkhoven's plan was to throw down hydrated oxide of copper from commercial sulphate by liquor potassæ, and dissolve it thus obtained in liquor ammoniæ. Peligot's plan amounted to the same thing, and was the one he (the author) employed.

It consisted in placing copper turnings in a funnel in which some pounded glass was put, and pouring liquor ammoniæ upon it. The air oxidized the copper, and the ammonia dissolved it as fast as formed. The solution, which should be passed and repassed through the copper turnings, that it may be saturated with oxide of copper, is allowed to stand, that all impurities may subside, and is then decanted. Carded cotton is then introduced in the proportion of about two parts to every twenty of the solution; it readily forms a viscid solution, and, that being complete, is ready for use. Iodide of potassium is added, dissolved in water in about the proportion of $2\frac{1}{2}$ grains to the ounce.

If well prepared, it is perfectly transparent, of a deep-blue colour, and flows readily upon the surface of glass.

When employed as a photographic medium, it is poured as a film-like collodion, and allowed, like it, to set partially, which is known by a whitish opalescent margin appearing (this occurs, of course, at varying intervals, on account of the varying state of the temperature and its hygrometric condition, but an average time is half a minute); it is then immersed in a bath consisting of water, 100 parts; nitrate of silver, 10 parts; acetic acid (glacial), 5 parts. A few seconds' immersion is sufficient. The surface of the film whitens, and should have a homogeneous texture. It is then exposed in the usual way, and, according to the author's experiments, requires rather a longer exposure than collodion—say 30 seconds. It is then developed. For this the author used—pyrogallic acid, $1\frac{1}{2}$ grain; water, 1 ounce; acetic acid, 10 minims; then washed and fixed with hyposulphite of soda. The picture obtained is in many respects a good one, and the process, generally speaking, one of much promise.

The advantages to be enumerated are—its great cheapness, its facility, its uniformity of composition, and the fact that commercial nitrate of silver may be employed for the bath; also, its remaining moist in very hot weather, and that it may be kept in the air many seconds before immersion*. Its principal disadvantage—and it is that with which

* It must not, however, be kept too long before immersion in the bath, or the ammonia volatilizes, and the ordinary reaction of the alkaline iodide of potassium on the deutoxide of copper takes place; that is, Cu_2I is formed in the film, and free iodine deposited on the surface.

the author had principally to contend—is that the film is liable to become detached when immersed in the nitrate bath. It remains to be shown why this so frequently, and apparently so capriciously, occurs; the author believes it to be due to the energetic chemical action which takes place between the ammonia of the cotton solution and the acetic acid of the bath, which is required to be in excess to dissolve excess of copper. He intends making experiments on the subject with the hope of obviating the difficulty, as also to employ the "cellulose" as a dry process. With respect to failure, those accustomed to chemical manipulations will easily understand how hard it is to pronounce wherein it lies, since much disappointment must be encountered and much inductive experiment used before success is attained. What becomes of the copper? The author believes that it, with the cotton in solution, acts as a base to a radical in the first instance, and that excess is removed by the acetic acid as a diacetate.

The author apologized for the hasty and imperfect manner in which his remarks were conveyed, but hoped to renew the subject with more effect and better success during the ensuing session.

At the conclusion a vote of thanks was tendered to Mr. Wheeler, and the meeting separated.

On the Iodide and Bromide of Magnesium.

To the Editor of the Photographic Journal.

SIR,—At this season of the year, when photographers are busy at work, and have in consequence but little time for writing, it may interest you, and serve to fill a gap, if I communicate a short account of some experiments which I have lately made with the iodide of magnesium as an iodizer in negative collodion. It appeared uncertain, at the conclusion of Mr. Mayall's paper, lately read before the Society, whether the great stability of the collodion which he recommended was attributable to the employment of the magnesium compounds, or merely to the association of bromide with iodide, independently of the saturating base. There were some grounds for entertaining the former notion, because although, as chemists are well aware, the affinity of iodine for magnesium is not strong, and the iodide in consequence is unstable, yet it seemed possible that the formation of oxide of magnesium in collodion might not be attended with the same retarding effect as that produced by oxide of potassium or oxide of ammonium. We know that free potash and free ammonia both decompose pyroxyline, and generate products which are injurious to the rapid action of light upon the sensitive iodide. Magnesia, however, has not been shown to exercise so marked an effect; and hence there were fair grounds for conjecturing that iodide of magnesium would prove to be a stable iodizer. The experiments which I have made, however, do not confirm this idea; on the contrary, they establish a conclusion which is opposed to it.

To prepare iodide and bromide of magnesium I proceeded in the following manner; and I think it necessary to detail the process, because it may, perhaps, be objected that the salts which I employed were not in a pure state:—

Recrystallized sulphate of magnesia was subjected to a heat considerably above that of boiling water, in a porcelain capsule placed on a sand bath. It partly melted, boiled, gave off a considerable quantity of water, and finally dried up into a white mass, which experienced no further change on continuing the application of heat. Twenty grains of this substance were then finely pulverized and rubbed up in a glass mortar with twenty-four grains of iodide of potassium and eight grains of bromide of potassium, both pure and finely pulverized. The salts, having been thoroughly mixed by hard rubbing, were introduced into a bottle and shaken up with two fluid ounces of alcohol of sp. gr. ·803 at 60° Fahrenheit. After ten minutes' agitation the whole was thrown on a filter; and when the liquid had run through, alcohol of the same strength was poured upon the precipitate until the filtrate measured two ounces.

In preparing iodide of magnesium only, without the bromide, the same plan was adopted, merely altering the proportions. In either case a double decomposition takes place, the magnesium appropriating the electro-negative element, and sulphate of potash remaining insoluble.

The alcoholic solution of the iodide of magnesium so prepared was colourless at first, but even when kept in the dark it became slightly yellow in the course of two or three days, and when exposed to air and diffused daylight darkened more rapidly. On applying chloride of barium, *sulphates* were found to be present only in traces, quite inappreciable in photography; and on dropping the alcoholic solution into ether, the absence of potash-salts in anything like quantity was proved. I am, however, of opinion that this method will commonly yield a product contaminated slightly with iodide and bromide of potassium, although not at all in such proportion as to produce spots in a nearly anhydrous bromide collodion. The recommendation of the process is its simplicity;

and the salts so formed are at the least quite as pure, photographically, as the iodide and bromide of magnesium which I obtain in commerce.

The reaction of iodide of magnesium to reddened litmus paper is not so alkaline as that of iodide of potassium, but approaches more nearly to the absolutely neutral state.

The two salts, iodide of potassium and iodide of magnesium, when used in collodion, appeared to correspond in the first instance, both as regards sensitiveness and intensity. They were tried many times, on the same glass, backwards and forwards; but no difference could be detected. At the expiration of a fortnight, however, the collodion containing the iodide of magnesium had assumed the deepest shade of colour, and was somewhat less readily impressed by a feeble ray of light than the other.

Collodion iodized with iodide of magnesium is not rendered more glutinous, like that containing the iodide of cadmium; but, on the other hand, it is not so limpid as the same collodion iodized with iodide of ammonium. It appeared to me that the flowing qualities of this magnesium collodion were very good; and certain marks, like the combings on the backs of copy-books, &c., which will sometimes show in my pyroxyline when the plate is held too long before dipping in the bath, were absent. It is certain that all such markings depend partly upon the nature of the iodizer; and at present I am inclined to the belief that the iodide of magnesium does not favour their occurrence.

An interesting question arose as to whether the use of magnesium-salts in collodion would prevent that repelling of the developer which is sometimes noticed when the plate is kept too long before exposure. Theoretically, it might be supposed to do so by producing, in the bath, nitrate of magnesia—a deliquescent salt, and one likely to preserve the film in a moist condition; but in practice I was unable to satisfy myself that such was the case. More seems to depend upon the pyroxyline in the collodion, whether it be of the horny or the powdery kind; and even the addition of alcohol will not, with some varieties of pyroxyline, altogether destroy this quality of easily becoming surface-dry.

Taking for granted, therefore, that the iodide of magnesium is not one of those compounds which, like iodide of cadmium, remain nearly unchanged in collodion, it may be inquired, to what is the stability of such a preparation as Mr. Mayall uses to be ascribed? We answer, to the association of a *bromide* with the iodide. The chemical decompositions which ordinarily take place in collodion simply iodized are, after some manner not yet explained, either modified or arrested by the presence of bromide; and, provided the nitrate bath be strong, and the reducing agent of sufficient power, the loss of sensitiveness will be small, even after long keeping. When the pyroxyline is of a really stable kind, we may obtain results in this direction, with a bromo-iodized collodion, which at one time were thought to be impracticable without the use of cadmium.

In making experiments upon the coloration and decomposition of collodion after iodizing, it must not be forgotten that both ether and alcohol, when prepared from methylated spirit, have a property of reabsorbing the iodine first liberated, and especially so in presence of a bromide; hence the depth of colour assumed by such collodion is not a true index of the amount of the decomposition.

F. Hardwich.

Improvement of Cameras.

To the Editor of the Photographic Journal.

St. Thomas's Chambers,
June, 1859.

Sir,—I could wish the reporter of our Journal were able to photograph sound. Beside putting bad English into my mouth, there are some other "distortions" in the report of the few observations I made at our last Meeting. But I must first revert to the subject of swinging backs, which is kept out of sight altogether.

I set out with stating, what I now repeat, that the application of a swinging back (or any modification to produce the effect of a swinging back) is wrong in principle. Now, I think, in the organ of the Photographic Society, such questions ought to be prominently brought forward, that truth might be elicited by means of the best, because the most deliberate, discussions—*correspondence*.

I will not tire your readers with formulæ and diagrams, but merely recall to mind a simple experiment with the common burning-glass, held between the sun and a cardboard. If the common axis of the sun and the lens do not intersect the plain of the cardboard *perpendicularly*, the image of the sun is thereon represented *elliptically*.

Substituting landscape, &c., and focusing-screen for sun and cardboard, we arrive at the same result: we may, indeed, get *most* points in good focus, *i. e. distinct*; but *every one* point will be *distorted*.

Then, as to Daguerre's door, your report makes me state that it admitted dust. What I said was, that the French were *too* fastidious and *feared* they would thereby *raise* (not admit) dust. But practical photographers see that there is no dust in the camera, and then it cannot be raised; and I moreover stated that

I had adopted the door myself, without in the least being inconvenienced by dust. There seemed at first a difficulty to apply the door in conjunction with the arrangement of my focusing-screen, with regard to the fastening of the door when shut; but Mr. Ottewill and myself have overcome it. The ease and speed in working with my camera are about 300 per cent., without exaggeration. The other advantages you have enumerated in the report. You also well described the arrangement of the focusing-glass; but the annexed stereogram will perhaps elucidate it better to the general reader:—

A is a 12-inch-square camera, and *a'* a 5-inch camera; *f*, *f'*, their respective focusing-screens, held in position by elastic bands, *h*, *h'*, which are slipped over projecting knobs, *k*, *k'*. B, B' are the backs; B in the act of being slid down between the camera and screen, now displaced; B' shows its inner door, *d*, open—its position while the plate is exposed. This door is opened and shut by means of the lever *m'*; when closed, the bolt *l* is turned 90° by means of the other lever *n*, which slides over a spring, whereby it is prevented from going back. The back is now ready to be withdrawn from the camera. Attached to *f* is *fc*, a focusing-cloth, consisting of a black velvet bag, through the opening of which runs an elastic band, large enough to admit the head of the operator.

N. Ennel.

*** The woodcut, from a photograph by Mr. Ennel, will appear in the next Number.

Mr. C. J. Burnett and M. Niépce de St. Victor.

To the Editor of the Photographic Journal.

Sir,—I must enter my protest against the Report of the Blackheath Photographic Society, which appears in your Journal of June 15. It is melancholy enough to find the inheritor of the illustrious name of Niépce disgracing it by quackery and imposture; but it is yet worse to find such a body of men as the Council of the Blackheath Society deliberately setting to work, and going out of their way to endorse a falsehood, and confer on this impostor a certificate of honesty, genuineness, and fair dealing. Can they for one moment pretend that I have not produced sufficient evidence of my priority?—which being shown, common honesty would have forbidden the issuing of such a Report as they have issued, even supposing that there had been every presumption in favour of M. Niépce's rediscovery having been a genuine and independent one. But what are we to think of their Report, and of them, when the evidence is all in the other direction? *E.g.*: how would any fair-dealing and straightforward person have acted when his attention was called to the fact of his new discoveries having been long ago made and published by another? Would he not at once have admitted the fact, and expressed regret, great or little as it might be, for the blunder he had made? Instead of this what do we find? We find M. St. Victor and his backers either ignoring my priority and claims altogether, or resorting to the most ludicrous shuffling to evade the consequences of what they cannot deny; and we find that M. St. Victor himself, soon after his attention, and that of all concerned, had been *unmistakeably* called to my old papers on Marine Photography (determined, apparently, that his good faith shall be no longer susceptible of question), setting to work deliberately at those very papers, and picking out from them my various processes, and cooking them up, week by week and month by month, with accompanying congratulations and acclamations from himself and his friends, as wonderful and important new discoveries of his own. With the facilities for experiments which France, and his position there, can offer, not one single improvement on my new uranium process has he been able to produce. Those who wish to see practical illustrations or specimens of his new processes of to-day or to-morrow have had all along only to turn their eyes to my specimens produced years before*.

C. J. Burnett.

* His last new process for producing black photographs without silver or gold is simply, as you know, the most gross plagiarism of my neutral-tint, or iron-toned uranium process, of which specimens have been exhibited years before, as well as at your Suffolk-street Exhibition, and described at full length in the conclusion of my paper on Printing, in the Journal, which had been for two months in your hands, along with an illustrative specimen sent you some time before, with full details, to provide against the possibility of M. Niépce bringing it out, as he had been doing with my other processes, and claiming any merit for details which, though alluded to and necessarily following on what was laid down in my old papers, had not yet been so formally laid down, at least in printing.

The "Glycerine Process" in Photography.

To the Editor of the Photographic Journal.

43, Piccadilly, W.,
1st June, 1859.

Sir,—In the last Number of the Journal, a paper was published, which was read on the 10th ultimo to the Photographic Society of Scotland, "On a useful application of Glycerine in the Collodion Process," by Mr. T. Rodger, of St. Andrew's.

Now, without any desire to claim your aid for the purpose of asserting our priority of

publication, we ask leave to mention the following facts.

A process identical with that of Mr. Rodger's paper, and used with exactly a similar object, was one among certain others that, in our hands, had for some time stood the test of actual work.

Deeming it, for reasons hereafter given, of some value, we published it, and other photographic improvements and propositions, in a pamphlet dated the 31st of March last.

We may add that, both before and since, we have advertised this pamphlet in your Journal as at the command of any one who would send us three stamps, and that by such means it has been largely circulated.

Setting aside, however, our claim to priority of use and publication, we confess—assuming Mr. Rodger's paper to have been written without his being aware of our experiments—that we are much gratified to find that it confirms the value of the glycerine process. Supported, therefore, by this testimony, we would invite the attention of photographers, through your columns, to try the "plan for deferring the fixing of negatives," which we give from the pamphlet above-mentioned (p. 12) advising them to try it:—

"After the application of any of the ordinary developers, and the usual washing—a small quantity being sufficient for this—coat the negative with *glycerine and water* mixed in equal proportions (pouring off the excess in the ordinary way), and put it carefully into the plate-box. It can then be fixed after returning home, the next day, or indeed within any reasonable time: all that is required is, in the first place, to wash off the glycerine; and this it will be found can be done very readily.

"Nor is it necessary to obtain, by the development in the field, the whole intensity the negative is capable of giving. Generally, in using the iron-salts, sufficient is accomplished if all the required details of the picture appear. Any degree of intensity can be got by using the formula given below, which was published by Mr. Shadbolt in the 'Liverpool Photographic Journal':—

"'Fix with hyposulphite of soda, wash well with common water, drain slightly, and then wash with a few ounces of distilled water; again drain, and pour on a solution in the proportions of—

Pyrogallic acid . . .	2 grains,
Citric acid	1 grain,
Distilled water . . .	1 ounce,

to which add about 20 drops of pure solution of nitrate of silver (about 30 grains to the ounce), but not that previously used for baths or any other purpose. Finally, wash well: no more fixing will be required.'"

A few words in explanation, and we will trespass no further on your space. It is admitted that an important step would be gained, if the means of working the ordinary wet process were rendered portable, convenient, and simple. This is chiefly our aim: it was the object of the glycerine experiments, and it was with the view of calling attention to the results at which we had arrived that our pamphlet was published.

MURRAY AND HEATH.

Transfer of Film to Leather or Cloth.

To the Editor of the Photographic Journal.

Carlisle, June 7, 1859.

SIR,—In your Journal of May 7, I find a mode of transfer of the collodion film to leather or cloth. Many inquiries have been made for such a desideratum, and many plans adopted; but you know simplicity in any process is to be desired, when the end to be gained is the same. By referring to No. 5 of the Photographic News, at page 56, you will find a communication from me on that subject,—the simplest and most effective, I think, yet offered; so much so, that Sir David Brewster wrote to me for a specimen, as he intended to insert the formulæ in the 'Encyclopædia Britannica': so if you think so simple a process is worth a place in your pages, I send it for the use of your numerous readers, with a specimen transferred with spirits of wine alone.

Process.—Cut your leather or cloth a little larger than your positive; lay it, face up, on a table; take about ½ an oz. spirits of wine, and add 3 or 4 drops of nitric acid; shake up, and it is fit for use. Take the positive, after being dried by the fire or otherwise, and pour the mixture on as for collodion, and when still wet, lay it on the oil-cloth or leather, face down, gently pressing out the air-bubbles with your thumb or finger; keep in contact, either in the pressure-frame, or in a book with a weight upon it, until the spirits of wine is dry, and you may separate them easily; the film is so firmly united to the cloth that you cannot scratch it with your finger-nails. Too much nitric acid quickly disintegrates the collodion film, and makes it difficult to manage; and the less it is tortured in the manipulation, the better; but without the nitric acid I have obtained as good results, and it is more easily managed. I have found this plan the easiest of any I have yet tried.

JOHN OSTELL.

On the Production of Pictures by means of Iodine and Guaiacum Resin. By L. E. Jonas.

The property of vapours of iodine, when they pass over any surface, of depositing themselves in the form of fine crystals of iodine upon all elevations, has been employed by the author in producing impressions of lithographs, &c. If a picture of this kind be exposed to vapour of iodine, and then pressed upon a paper moistened with tincture of guaiacum, a blue copy is obtained. To produce a good result, the following things are requisite:—

1. A paper of peculiar strength, evenness, firmness, and smoothness, and quite free from starch.

2. An alcoholic solution of guaiacum, which especially possesses the property of acquiring a blue colour (1 part of resin and 32 parts of alcohol).

3. The maintenance of a definite degree of moisture at the moment of pressure, and the coating of the paper with the solution of guaiacum.

4. Powerful pressure upon the original, which must be sufficiently iodized to allow the iodine to penetrate the paper.

The more delicate and clear the picture or writing which is to be copied, the better is the result. Other objects, which present distinct elevations and flat surfaces, may be printed from by suitable arrangements; this is especially the case with parts of plants, as in the well-known nature-printing.—*Journal für Prakt. Chemie*, lxxv. p. 244.

[The above article, although not strictly photographic, we believe will interest many of our readers, and perhaps give a hint which may be useful in our art.—Ed.]

Aid to Science-Instruction.

The following Minute has been recently passed by the Committee of Council on Education:—

My Lords proceed to revise the Minutes which have been passed in the Science and Art Department for the encouragement of scientific instruction among the industrial classes of this country who have already received primary education.

I. All former Minutes relating to Science or Trade Schools, and Scientific class-instruction, except those referring to Navigation, Public Lectures, and the training of Teachers (as hereafter appended), are hereby cancelled, and the following regulations are substituted in their place.

II. The Science and Art Department will hereafter assist the industrial classes of this country in supplying themselves with instruction in the rudiments of—

1. Practical and Descriptive Geometry, with Mechanical and Machine Drawing, and Building Construction,
2. Physics,
3. Chemistry,
4. Geology and Mineralogy (*applied to Mining*),
5. Natural History,

—by augmentation-grants in aid of salary to competent Teachers, and by payments and prizes on successful results, and grants for apparatus, &c.

III. Any School or Science Class, either existing or about to be established, and duly approved by the Science and Art Department, may apply, through its Managers, *for a Certificated Teacher*, or for the certification of any Teacher, in any one or more of the above-named branches of Science.

IV. Examinations for certificates of three grades of competency to teach any of the above-named Sciences will be held annually by the Department, in the last week of November, in the Metropolis, as follows:—

Nos. 1, 2, and 5, at South Kensington.

No. 3, at the Royal College of Chemistry, Oxford Street.

No. 4, at the School of Mines, Jermyn-street.

V. Annual Grants, in augmentation of salaries of Teachers so certified to teach in any of the above-mentioned Sciences, will be given as follows:—

For the 1st Grade of Competency, £20.
" 2nd " " £15.
" 3rd " " £10.

Any Teacher holding a certificate of competency to give primary instruction will receive from the Science and Art Department a sum equal to the augmentation-grant which has been attached to such certificate, in addition to the grants above mentioned.

VI. Such grants will only be made while the Teacher is giving instruction in a School or Science Class for the industrial classes, approved by the Department.

VII. The Department will require that suitable premises shall be found and maintained at the cost of the locality where the School or Class is held; that the names of ten students shall be entered, whose fees for half-a-year shall have been paid in advance; and that the local Managers shall guarantee, for the support of the Schools and Teachers, from fees or local funds, a sum at least equal to the grants so long as they shall be paid. If at any time neither fees of pupils nor local funds cover the requisite amount, it must be inferred that there is no demand for instruction in the above-

named Sciences, in that locality, which the Government is justified in aiding; and the assistance of the Department will be withdrawn.

VIII. Every School or Class having a certificated teacher will be inspected and examined once a year by the Department, and Queen's prizes of an honorary kind will be awarded to successful students.

IX. Payments will be made to the Teacher —on each first-class Queen's prize obtained by the student, £3; on each second class, £2; and on each third class, £1.

X. A grant towards the purchase of apparatus, fittings, diagrams, &c., of 50 per cent. on the cost of them, will continue to be afforded to Schools and Classes in Mechanics' and similar Institutions.

To the Editor of the Photographic Journal.

Dublin, June 27th, 1859.

Sir,—As, in common with other photographers, I have become tired of witnessing my positive prints "fade as the leaves do," I am induced, through the medium of your pages, to request some of my brethren in the art, who have turned their attention in that direction, to present the public with some simple and (though severe) fair test of the durability of the results of the various systems now published. I have lately been fixing and toning some prints upon a rather loosely-given formula in a late number of the "Bulletin de la Société Française de Photographie," which its inventor, M. Jobard, describes as perfectly permanent. Now, as we have all had too much cause to view with suspicion such assertions, and as time is an object in such matters, it would be a great boon to have within one's reach some simple means whereby the permanence or the contrary of different printing processes could be determined even approximately, without having to wait for the verdict of years.

With respect to this formula of M. Jobard, which I append, I am the more anxious to ascertain its chance of permanence as it is simple and reasonably cheap in its nature, and has yielded to me tones far superior to any I have obtained from other processes. That which I most admire is a rich bistre, and I withdrew my prints when they had attained that hue; but I have no doubt that by leaving them a longer time in the bath of sel d'or, any further shade up to blue-black could have been obtained, as M. Jobard affirms. The paper I employed was Marion's "super-extra albuminée," which it will be acknowledged is a severe test, and it is certainly so far in favour of this system that the whites of the pictures have throughout the whole operation preserved the most pearly clearness without a suspicion of yellow. The following is the formula as I work it: it is, however, as I before said, so loosely stated in the French journal that it is possible I may have rendered it unnecessarily tedious.

Placethe prints direct from the frame in a bath of the following proportions:—

Hyposulph.	20 grammes.
Water	100 "
Bicarb. soda	4 "

Leave the prints in this for at least 15 minutes, and then wash them as usual for 24 hours with frequent changes of water, the last being hot, after which submit them to the following bath:—

Bromide of potassium	3 grammes.
Iodide of potassium ..	2 "
Soft water..........	100 "

Lastly, place them in the following toning bath until the requisite shade of colour is obtained, after which a very slight washing is all that is required:—

Sel d'or...............	1 gramme.
Soft water	1 litre.

Meniscus.

Defects in Fothergill Process.

To the Editor of the Photographic Journal.

Sir, — Having lately received several inquiries similar to that of your correspondent W. C. J., headed as above, and the specimen prints accompanying them giving unmistakeable evidence that the defects were caused by the developer not being kept in motion, I would suggest the probability that the solution of your correspondent's difficulty may be looked for in that direction.

With the present high temperature, the nitrate of silver added to the pyrogallic or iron developer *quickly* decomposes, and, unless the solution is kept in almost constant motion, is unequally deposited upon the surface of the plate, assuming forms depending upon the direction the waves of the developer had taken when in motion. If they are lengthwise, and the plate level, the negative will show *ripple-marks* of unequal density; if across, and the plate inclines to one side, the tendency will be more in the direction of straight lines, and so on,—all showing more in the sky than elsewhere.

To those who wish to avoid the constant attention necessary with a pyrogallic or iron developer, I would recommend the following, adopted and practised with the greatest success by my friend Mr. Bright:—

Gallic acid, in powder ..	1 drachm.
Glacial acetic acid......	1 "
Alcohol, of each	1 "
Distilled water	20 ounces.

Put the whole into a bottle, and *occasionally* agitate during several hours. To each *ounce* of the above, previously filtered, add from four to six drops of a *ten-grain* solution of nitrate of silver—*not* bath-solution, and put sufficient into a suitable-sized dish to cover the plate or plates to be developed to the extent of a quarter of an inch; moisten the surface of the latter with distilled water, and then place them collodion-side upwards in the solution, and cover the whole to exclude even the yellow light. They will require from an hour upwards to develope, but need no further attention than occasionally examining whether sufficiently intense: development must not be carried too far, or loss of half-tone will be the result, as with other developers.

This quantity of glacial acid and silver solution will require varying with the temperature; they should be in such proportions that the solution is only slightly coloured at the end of development.

Should the long-continued contact of the developer cause the film to have a tendency to leave the glass, after fixing and well washing, varnish with a dilute *filtered* solution of albumen —say prepared albumen one part, water five parts,—and when dry apply usual negative varnish.

I would add that markings of a zigzag form are produced by allowing collodion to set *too much* before immersion in sensitizing bath.

ALFRED KEENE.

Photography applied to Musketry.

A SERIES of interesting and valuable experiments have been made during the last few days by Lieutenant Walker, 79th Highlanders, of the School of Musketry Staff, Hythe, on the application of the photographic art to the science —for such it has become—of musketry, with the view of obtaining, by means of the former, a true and exact copy of the target-practice of a section or any other number of men at one or more targets. We are glad to learn that these experiments have been attended with a most satisfactory result,—Lieutenant Walker having established by them the important fact that, by means of the chemical influences of light, every "hit" or impingement of a bullet, however slight, can be transferred from the target to paper with an infallible accuracy and a celerity which at once renders obsolete the former tedious and oftentimes inaccurate method of copying by the hand the impression made by each shot on the target's surface, on to a diagram which had previously to be prepared for the purpose. This novel adaptation of photography will be found peculiarly useful in testing the comparative merits of different firearms; and in these days of volunteer rifle corps it would prove highly useful and interesting if each company had a photograph taken of its target-practice; and, as any falsification of returns would by this plan be rendered impossible, on a general comparison being made of them throughout the country, it would at once be seen to which corps belonged the palm for the best shooting.

Maps reproduced by Photography.

To the Editor of the Photographic Journal.

SIR,—In your last Number I observe a notice of the beautiful reduction of the Government Austrian map of the Lombardo-Venetian Kingdom, through the means of photography, by MM. Bisson (brothers), which concludes with the observation that MM. Bisson "have thus opened a new field to the photographer." The general reader would have the impression that MM. Bisson have been the first to apply photography to the reduction of maps; but this is by no means the case, as since 1855-56, Colonel James, R.E., who is at the head of the Trigonometrical Survey of the United Kingdom, and with whom originated the idea, has applied photography with the most perfect success in the reduction of the Ordnance Survey Maps, all those on the large scale being now reduced by that method. The glass building where the photographic reductions are made forms a very handsome addition to the Government establishment at Southampton.—AN OLD SUBSCRIBER, Athenæum Club.

The Archer Fund.

To the Editor of the Photographic Journal.

SIR,—The remarks of your correspondent "Philo-Sagittarius" ought to remind photographers, both amateurs and professionals, of their neglect and hardheartedness towards the orphan children of one who, if his nature had not been more generous than theirs, might have ensured a competence to his family.

I should much like to see published (without further comment) a list of all known photographers, distinguishing those who have and those who have not subscribed to the fund.

The niggardly way in which this urgent case has been met will prove a great discouragement to others, and prevent future valuable discoveries being made public.

J. P. M.

ANSWERS TO CORRESPONDENTS.

July 5, 1859.

Sir,—Can you give me any information on the following points:—1st. Is the Photographic Exchange Club, of which the Rev. J. Major was formerly, and Julius Pollock, Esq., was subsequently the Secretary, still in existence? and has there been an exchange of photographs within the last twelve months? (the Rules state that there shall be an exchange twice in the year). 2ndly. Is there any other Society for the exchange of photographs? A reply to the above queries will greatly oblige

An Amateur.

Mr. Pollock has lately made a distribution of his collection for the members for the past year. Several of the old members have retired, and newer and more active hands supplied their places. There is also the "Photographic Exchange Club," who publish annually the 'Photographic Album,' a handsome folio volume. It is, we believe, limited to fifty members; and the photographs contained in it cannot be bought. Professor De la Motte, of King's College, kindly acts as Honorary Secretary. Exchange Clubs should be promoted in various parts of the country; they produce much good feeling amongst their members, and are more agreeably conducted amongst a few friends than on a large scale. Many amateurs will not object to printing a limited number of their pictures, which becomes very tedious when extended.

H. P. (*Chertsey*).—Your bath is very likely to deteriorate if kept in gutta percha; we have long since discontinued the use of that material for the purpose, and substituted glass or porcelain.

Cyanide.—You may probably use cyanide of potassium, with no ill results, in cleaning your hands, for a long time, without inconvenience; on the contrary, you may be in a peculiar state of health, which renders the application dangerous; we have lately been informed of more than one friend who has suffered much.

A. A. B.—The coast views were taken by Mr. Downes, of the Photographic Institution, New Bond Street. One was exhibited in Suffolk Street, and was much admired as an instantaneous picture.

Amateur (30th June) writes that he has not been so successful in using Dr. Draper's intensifying process with chloride of palladium as he anticipated; for, although the blackness to the eye was very intense, he did not find that the action of the light was so much obstructed as would be supposed; and he recommends that others should contribute their experience.

A Collector.—1. Probably Mr. Fry can answer your inquiries, as he has formed a very valuable library relating to the heliographic art. Mr. Fox Talbot published a quarto volume called "Sun Pictures in Scotland," and it contains a notice that the pictures are *truly* photographs, and not prints taken from them, as has been supposed. 2. There is a copy of the "Pencil of Nature," also published by Mr. Fox Talbot, in the possession of the Photographic Society, having lately been given by Mr. B. B. Turner.

Bruges, June 17, 1859.

Dear Sir,—Will you allow me to correct an error or two in my communication on copying pictures, page 284, which may both puzzle and mislead. In naming the proportions of iodide and bromide used in the collodion, the quantities have been reversed; they should be read as follows:—"iodide 2 parts, bromide 1 part." The printers have put it *pints*. Just fancy using iodides and bromides by the pint! and in a former communication they made me call a pneumatic plate holder, a *prismatic*. Putting, however, all the fault on my illegible writing,

I am, &c.

Hubert Moxham.

I. H. M.—Many thanks are returned to this gentleman, who has kindly sent us some seeds, which yield a jelly which is recommended for photographic purposes in lieu of albumen. Should success attend our experiments, the results shall be made known.

I. Y. A. complains of silver deposits on his plates like brush-marks, if he uses the collodion of a particular maker, but not so if he uses another sample. It is no doubt depending on an improperly cleansed glass. There is a vast difference in collodions in this respect, some requiring much less care than others in their use.

W. S. R. (Dublin).—1. Your request has been attended to with much pleasure. 2. Mr. Skaife's *pistol* camera is sold by himself at Vanburgh House, Blackheath: we were unfortunately absent from a lecture which that gentleman delivered on Instantaneous Photography, but have since seen an enlarged picture from one of his small negatives; and although it is not so fine in focus as we could wish, it is certainly very artistic, and must be very valuable to the person represented. 3. We have never seen any wax-paper negative strengthened satisfactorily. Following some advice which had been tendered, we thought success had attended the operation; but after a very few days the negative returned to its former state. 4. With many thanks, your proposed contribution will be accepted.

A Brother.—We are informed you are in error in supposing the Manchester list has not been accounted for.

W. Sparks.—We believe that the Crystal Palace Company have most liberally sent a free admission to every one who has contributed to their Photographic Exhibition: this is liberal on their part, and at the same time beneficial to the Company; for we feel confident that it brings many other visitors with those receiving the privilege. If you have any complaint, write to Professor De la Motte, at the Palace.

Fothergill Process.—1. A previous letter sent. 2. The markings W. J. C. complains of in the Fothergill process, occur in the drying of the plates. They should be placed to dry vertically on a square of glass, supported at each end by a narrow slip of glass, so as to leave a space between the lower edge of the glass and the plate on which they stand. *Deal* should be avoided. I place mine to dry (10×12-plates) in a tin box, surrounded by hot water. T. L. S.

Communications received.—J. A. C. Branfill; Mr. Ennel; Joseph Durham; W. Hazlitt; G. Carmichael (Dundee); C. J. Fox (New York); J. E. Bruton (Port Elizabeth; William Telfer; Rev. T. L. Sutton.

"Photography in Colours" in our next.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. Taylor and Francis, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 88. AUGUST 16, 1859.

Among the pensions on the Civil List just laid before the House of Commons is one entry which has a peculiar interest for photographers. This entry reads, "Alice, Constance, and Janet Archer, £50, in consideration of the valuable contributions of their late father to the science of photography." A very dry statement of facts, as official records mostly are, and covering, as we think, and many of our friends think, a most unworthy expression of national gratitude. Each of these young ladies, daughters of a man of genius, not rich in friends or in this world's goods, will receive from a bountiful country, as a reward of their father's service, about elevenpence a day. This is surely insufficient, either as a public recognition of Mr. Archer's claims, or as a provision for his children. In one form or another, we trust the insufficiency will be supplied. Naturally we should prefer the public form of a pension; for this form of recognizing noble and useful acts involves honour as well as provision, and illustrates the dead while it brings comfort to the living. Sir William Newton, as we infer from a note which we print lower down, agrees with us in this, and, while labouring with many other friends to increase the photographic subscription for the Archers, proposes to strive for an additional grant of £100 a year in the next session of Parliament. Photographers should aid in this attempt; and they may do so easily and effectively by an occasional hint to their Parliamentary representatives. A score of suggestions from gentlemen behind the Treasury benches may have a miraculous influence over the mind of a prime minister doling out "rewards to genius and learning."

Mr. Archer has claims on the State beyond those of many discoverers who have received far ampler testimonials. He sacrificed himself to science. Though a most able draughtsman, as many of the popular books on coins will show,—an excellent sculptor, as the busts of Lee, Brunel, and Londesborough remain to testify,—he yet abandoned these professions, in which his genius might have won fame and fortune, to follow, with the unselfish ardour of the discoverer, the scientific pursuits which led him to the collodion process. In these pursuits he spent much money, and his time, which was money to him. He made his most important invention, gave it freely to the world, without reservation to himself of patent rights or exclusive use, and then died. A career more noble or unselfish is rarely seen. For its own sake, the world should charge itself with the task of seeing that his children do not suffer from his frank and open course. Genius is not always free from the grain of selfishness; and when it is forgetful of itself and lavish of its wealth, the world should encourage it by showing that it is not ungrateful.

Sir William Newton and Mr. Roger Fenton report a few additions to the fund, including ten guineas from Mr. Claudet. We give some details and suggestions in Sir William Newton's own words:—

"6, Argyll Street,
August 10, 1859.

"Sir,—Notwithstanding the appeal made in the last number of the Journal to those gentlemen who are making large profits by the use of collodion, and who have not contributed in aid of the Archer Fund, I regret to state that only one subscription of £1 has been added to the list, from Mr. Valentine of Dundee, whose

letter to me I enclose, which I would recommend to be inserted in the next Journal, as he has stated his case so well; and as in all probability there are many other persons equally disposed to assist, it might act as a *reminder*, which I trust will be realized.

"The only names to be added to the list of subscribers are:—

"Mr. Claudet (which was too late for insertion in the last published list	£10 10 0
"Osborne (June 7)	8 13 0
"Mr. Valentine (Dundee)....	1 0 0

"The Treasurers have made over into the hands of Trustees the sum of £618 6*s*. 9*d*. for the benefit of the three orphans, and they have in their hands, in addition, about £32.

"Now, although Her Majesty has been graciously pleased to grant an annuity of £50 out of the Civil List—which is very liberal out of so small a fund,—still it is by no means a compensation for the importance of the discovery of collodion for photographic purposes; and when it is borne in mind that the Government are effecting a saving to the country of about £30,000 a year (and no doubt a much larger saving will be obtained) by the use of collodion, without any consideration whatever, surely these children belong properly to the State, to see that they be amply provided for.

"I have already made endeavours to procure a parliamentary grant of another £100 a year, so that *each* child should have an annuity of £50, which, I cannot refrain from adding, they are justly entitled to from the State; and early in the next session I would recommend a strong petition to Parliament to obtain the above object, in conjunction with the Archer Committee.

"I am, Sir,
"Your humble servant,
"W. J. Newton."

The letter from Mr. Valentine, to which Sir William Newton refers, runs as follows:—

"26th July 1859.

"Sir W. Newton will please hand over the enclosed amount of 20*s*. to the Archer fund. I regret that I have been so long in responding to your call. I can only plead procrastination, which I am afraid is the principal cause why so little has been subscribed; and I think, had a person been employed to wait upon the leading photographers throughout the country, the list would have presented a very different appearance. I know that I was glad when the proposal was first made; and, had a person then called upon me, I would at once have given my mite.

"I do hope that the sum will soon be in some measure a testimony to the gratitude of photographers for the great benefits so freely gifted to them by the self-denial of the late Mr. Archer.

"With thanks for the interest you have taken in this matter,

"I am, Sir,
"Your obedient servant,
"James Valentine."

The Gallery of the Society of Painters in Water Colours, Pall Mall, has been secured by the Council for their next Exhibition, to be opened early in January 1860. We think the members of the Society and our numerous readers will be glad to be reminded that they might take every opportunity, before the season is over, of providing choice specimens for the occasion. Original discovery in our art is confined to a few; the inventors of modifications, once a numerous tribe, have dwindled down to a small party—probably because every substance analogous to honey has been used up; it is to art therefore that we must look for improvement and novelty. Hitherto, except with a few operators, art has been almost ignored, and nothing has demanded the attention of operators but technicalities—the beauty of half-tint, the rapidity of exposure, the purity of the whites, and the tone of the shades. It is very necessary to be proficient in these mechanical details; but unfortunately photographers often think they have attained perfection when they can with certainty obtain a negative containing all these qualities. But there is something more to be learnt yet: far from having arrived at excellence, they have only mastered the groundwork of their pursuit.

Photographs of paintings, engravings, machinery, and microscopic objects might be exhibited to show the various uses to which the art might be applied; but we would urge on our future exhibitors to aim at that grander development of our favourite science, its application to art. In landscape a better choice of subject might be made. The usual requirements of landscape operators are very prominent objects on which a full light falls: these are easily delineated; and no thought need be taken of the general effect. In the pursuit of definition, landscape beauty is lost sight of, the delicious effects of light and shade are missed, an object in shadow is considered worthless because the details are difficult to bring out: yet what is more beautiful than a gleam of sunshine glancing along a landscape, leaving all but a small strip in shadow? In portraits also art is smothered by conventionalities. We occasionally see a portrait full of life and vigour.

proving that such things are not impossible with a lens; but for one good, a thousand—we might say a million—bad ones are produced. Poetic compositions, and what we might term photographs *de genre*, are only attempted by a few individuals; and yet what a scope there is for the workman in light to show how well the poet's thought might be interpreted by the sun's rays!

Many men are so fettered by what they consider legitimate science that they will use none of the numerous appliances which, for want of a better term, we must call "dodges." They would rather spoil the effect of a picture than "sun-down" a sky; and some would rather not photograph at all than print a proof from two or more negatives. For those, we must paraphrase the words and say, "Make pictures — honestly if you can—but make pictures."

This long bright season of fine weather will do much to remove the feeling of mysterious awe with which the out-door photographer has hitherto been regarded by descendants of the vassal race which served the original inhabitants of that ruined castle on which his camera had an eye. Where the amateur artist was wont, day after day, to sit and do those pretty pencil drawings, with feeble wavy outlines to the masonry and angular lines for the trees, the amateur photographers now swarm, each with his or her tent—very gipsies of science.

"Have any photographers been here lately?" we inquired at a famous ruin on the South Coast. The accomplished guidess, who had the whole history of the place at her tongue's end and knew where all the murders were done, was evidently at fault.

"Anybody with a box taking pictures?" we explained. "Oh, yes, sir, there was one here last week; and he made SUCH a mess!"

Now that some hundreds of amateurs are busy at work throughout the country with costly cameras and elaborate apparatus, and very little knowledge of what they are about, a word of counsel to them may not be misplaced, lest when the rainy reason sets in and the short days begin, and the time for home comes round, they find, on critical examination of their negatives, they have only succeeded in making "such a mess." We fancy that a definition of photography has been echoed by many a vicious landlady, looking wofully at the black stains on her worn drugget (charged to the unlucky culprit as the finest Brussels), or dismayed at the ravages which cyanide has made on her wash-stands; but it is most distressing to the amateur himself, or herself. Many will turn these pages with very young fingers, whose work has hitherto only resulted in making a mess with perhaps a few foggy negatives (of which hope tells a too flattering tale, that they will print), and probably one or two very good pictures, but for an unhappy smear or other ill chance that renders them only worthy to be mourned over. But if any one on that account be inclined to despair of ever attaining success, we counsel the immediate dismissal of any such desponding thought. If they would gain knowledge, they must pay the price. *Omnes volunt scire, mercedem solvere nemo.* The fisherman never tells of his blank days; the sportsman seldom entertains his hearers with details of the number of birds he has missed. Brummell exhibiting in his white cravat said nothing of the spoilt cambrics that his valet exhibited with the remark, "These are our failures." And it may be a consolation to the aspiring but dejected photographer to know that every one whose name is famous in the art has passed through his ordeal of failures, and probably spoilt more pictures than the disheartened neophyte ever saw.

But patience and perseverance overcome all difficulties, as they have ever done since man was first set to pull up weeds; and patience we specially recommend as the best travelling companion of the protographer,—not the patience of that Chinaman who, when questioned as to why he unceasingly rubbed a large bar of iron on a dry smooth stone, answered that he was grinding it down to make a needle, not the patience that is content with miserable half-results, or satisfied with an inferior picture, and goes on producing these at infinite toil and waste; we mean the patience which is part of a determination to succeed. The first picture is a failure; everything has been done *en règle*, and the result is "such a mess!" Now it is the common mistake of the young photographer to immediately try again with the same materials and the same result, and so on, *da capo*, until the sun goes down, or his collodion is exhausted, or he confesses to being dead beat. There is one remedy for these continued and exasperating mishaps, and one royal road, as we believe, to success in photography. Whenever you make a failure, sit down to ascertain the cause. Ten minutes' thought is no waste of time under such circumstances; and it is better to have one good negative than to take home half-a-dozen with foggy figures, or weak skies, or unwholesome blotches, or a myriad of little holes, that look as if the negative had been worm-eaten. For the better effecting this purpose, we advise every photographer whose working information is not based on an accurate knowledge of

practical chemistry and optics, to carry about with him a small book, wherein he may put down all the causes of failure that he finds recorded in books, so that he may judge, by comparing the descriptions of others with his own spoilt picture, how best to avoid again making "such a mess!"

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

Instantaneous Photography.

To the Editor of the Photographic Journal.

Vanbrugh House, Blackheath,
August 3, 1859.

SIR,—I perceive, under "Answers to Correspondents" in your last 'Photographic Journal,' an allusion to my recent lecture on Instantaneous Photography. The lecture in question was given with the view of introducing the Pistol Camera to those wishing to make its acquaintance: and as the first description of this little instrument was published on the 11th of last December in 'The Journal of the Photographic Society,' it might not be uninteresting to those of your readers who had not an opportunity of attending the lecture to learn why "concave glasses," after repeated trial, have finally been superseded by the old-fashioned patent plate. Concave glasses to the naked eye appear faultless on the face of a watch, and rather pretty than otherwise when photographed "positively"; but when it came to the grand affair —"negative," for supplying an enlarged reproduction— the concave's unpolished surfaces told wofully; and though an optical-glass grinder engaged to rid me of those little vermin, dust-specks, which infest the surfaces of all blown glass, for the trifling consideration of twelve times the "concave's" original cost, no one could be found capable of supplying me with watch-glasses of an uniform thickness, polished or otherwise, excepting at a still more fabulous price.

So curvilinear photography fell, but not the Pistol Camera. This instrument, fitted with double achromatic lenses and modified to photograph aplanatic surfaces, now realizes pictures the size of a finger-nail, possessing as much detail as a first-class artist would paint on a cabinet picture one foot square, and which, consequently, would bear reproducing by means of an enlarging camera to an equal extent, or until all the details could easily be seen with the naked eye. But why not take the photograph a foot square at first, instead of being at the trouble of first taking it in small and then copying it once or twice before you get it to the size you want? Because a photograph one foot square generally requires an exposure 144 times the length of a photograph one inch square. And if the subject attempted be a waking child or a spirited horse, the chances in favour of the smaller photograph being successful would be as ten thousand to one. In other words, for every failure of a one-inch square photograph occasioned by the subject's motion, there would be at least ten thousand failures of the larger photographs from the same cause,—the loss in chemicals by the small failure being one third of a farthing, by the larger ditto £500—a reason which, when sufficiently comprehended, will no doubt have its weight with those who, though ambitious of photographing to the life, nevertheless object to spending £500 in the attempt to realize a photograph which in no essential point, when obtained, shall be superior to another of equal size of the same subject produced by the enlarging process at a cost of chemicals, from first to last, not exceeding thirteen pence!

The ways of Heliography are indeed devious when such an eminent pioneer in the science as Sir David Brewster, so recently as the 10th of November 1857, read a paper before the Photographic Society of Scotland, entitled "Optics of Photography," in which, after showing the superiority in point of correctness of small lenses over large ones, he makes the following mistake:—"When small lenses are used, the time of sitting must necessarily be prolonged, and a new imperfection might arise in the portrait from the motion and change of expression in the sitter." Possibly Sir David meant *large* lenses when he said *small* ones: or the eminent optician's anachronism may have originated in the assumption that the time movements of light's actinism were identical with those of heat rays; and as the latter when converged on a combustible material by a large lens had been found by M. Buffon* to be more energetic than those conveyed by a small lens, ergo the photographic actinism of a large lens would also be more energetic than that of the smaller. But, as various and numerous experiments by well-known photographers of eminence prove the contrary to be the fact, the point demands ventilation.

* Optics, by Sir David Brewster, p. 450.

A large lens will burn an object when a small one will not, by the same rule that a large cargo of quick lime will set fire to a ship when a handful will not; because a handful of lime has more of its surface in contact with heat-conducting material in proportion to its bulk than a large cargo has. But the smallest actinic ray falling on a photographic material produces an irrevocable effect, bearing the same relation to the magnitude of the cause as does the hole of a shot in a paper target to the shot which made it. And, as the smallest lens can converge its actinism into a point as intensely sharp as the largest lens can, therefore it is assumed the time-actinic power of the former, although producing smaller pictures, is at least equal to the latter.

But, as the larger lens is thicker in the middle than the smaller, then is the former less capable of photographing a picture as quickly as the latter by the amount of actinic rays which the extra thickness of its glass obstructs; and as this obstruction from excess of thickness is known to be "enormous*," therefore is it shown why small lenses work more quickly than large ones.

But another question remains to be disposed of, viz. why a microscopic picture of an object can be photographed more quickly by any lens than a photograph the natural size of the object by the same lens?

It being admitted that one cubic inch of light will manipulate one square inch of a photograph, whether the light be transmitted by a large lens or its diaphragm, or a small lens or its diaphragm, yet, as a cubic inch of light requires one second to pass through an aperture or diaphragm half an inch in diameter, 100 cubic inches (spread over the surface of a ten inch plate) will require 100 seconds to pass through the same aperture. And, therefore, a microscopic picture of an object 100 times less than the original can be photographed in the one-hundredth part of the time which the life-size photograph would require. And, although it might be unreasonable to look for all those details in the micrograph which would be found in the larger picture, it would still be more unreasonable to expect that the fond mother who idolizes her child would be disposed to wait the issue of the ten thousand failures which it has been already shown, according to the doctrine of chances, would result before a picture 10 inches square could be realized faithfully, portraying infantine expression, with texture of dress, when, by submitting to a slight sacrifice of some trifling detail in the latter, all the charming witchery of the former could with certainty be secured in a more practical, though more diminutive portrait, but which at any future time would be capable of germinating a larger of the required size: in proof of which I take the liberty of referring the connoisseur to a group of two children in a perambulator, done in the first instance by one of my pupils with the Pistol Camera, and subsequently enlarged. The children's faces in the original measure one-tenth of an inch; in the enlarged reproduction, one inch. The nurse, seen in the act of propelling the perambulator, had her head above focus in the small original, and consequently it is out of focus in the enlargement.

* Optics, by Sir David Brewster, p. 451.

Having already trespassed beyond a reasonable length on your valuable space, I will defer to some future occasion a description of the *modus operandi* by which those examples of enlarged reproductions now submitted to the public by Mr. Hogarth, at 5 Haymarket, have been obtained.

Thomas Skaife.

M. Niépce's Uranium Process and Mr. Burnett.

To the Editor of the Photographic Journal.

Blackheath, July 27, 1859.

Sir,—The letter of Mr. C. J. Burnett, which you publish in your No. for July 15th, demands some notice from us. In it he protests against our Annual Report; we presume he means against the few words relating to Uranium printing, as with no other part has he the slightest concern.

When we spoke of M. Niépce's Uranium printing process as one of some promise, we by no means meant to imply that M. Niépce was the first person to introduce Uranium as a photographic agent. We spoke only of the process by which certain prints were produced which, at the time we wrote, were being handed about at various scientific societies in London, and were exciting much interest. This process was detailed in a paper by M. Niépce published in the 'Comptes Rendus' for March 1858. We were not aware at the time of the identity of that process with one published by Mr. Burnett in 'Photographic Notes' for March 1857; or we should certainly have noticed the circumstance. None can regret more than ourselves the appearance of doing wrong to any man; and one line from Mr. Burnett, pointing out where his paper could be found, would have caused us at once to give him his due.

With the abuse so liberally bestowed on M. Niépce we have, of course, nothing to do; of that levelled by Mr. Burnett at ourselves, we can only say that we very much regret that the pages of a respectable journal should be

sullied with such expressions as "Going out of their way deliberately to endorse a falsehood," &c. &c., addressed to men whose sole crime is having been unfortunate enough to overlook a paper written by Mr. C. J. Burnett. We have, however, too much confidence in the justice and good taste of an *English* public to believe that Mr. Burnett's intemperate language will either injure our reputation or improve his own.

JAMES GLAISHER, President,
On behalf of the Council of the
Blackheath Photographic Society.

Report of the Commission appointed to consider the subject of Lighting Picture Galleries by Gas.

South Kensington, 20th July 1859.

THE Commission, consisting of Professors Faraday, Hofmann, and Tyndall, Mr. R. Redgrave, R.A., and Captain Fowke, R.E.,—appointed for the purpose of reporting to the Lords of the Committee of Privy Council on Education *On the Lighting of Picture Galleries by Gas, and on any precautions (if necessary) against the escape of Gas, and the products of its combustion*,—having met at various times and considered the subject referred to them, now make the following report.

There is nothing innate in coal gas which renders its application to the illumination of Picture Galleries objectionable. Its light, though not so white as that of the sun, is equally harmless; its radiant heat may be rendered innocuous by placing a sufficient distance between the gas jets and the pictures, while the heat of combustion may be rendered eminently serviceable in promoting ventilation.

Coal gas may be free from sulphuretted hydrogen compounds, and in London is so at the present time; it then has little or no direct action on pictures. But it has not as yet been cleansed from sulphide of carbon, which, on combustion, yields sulphurous acid gas capable of producing 22½ grains of sulphuric acid per 100 cubic feet of present London coal gas*. It is not safe to permit this product of the combustion to come in contact with pictures painted either in oil or water colours; and the Commission are emphatically of opinion that, in every system of permanent gas lighting for picture or sculpture galleries, provision should be made for the effectual exclusion or withdrawal of the products of combustion from the chambers containing the works of art.

The Commission have examined the Sheepshanks' Gallery as an experimental attempt to light pictures with gas, and are of opinion that the process there carried out fulfils the condition of effectually illuminating the pictures and at the same time removing the products of combustion. According to the indications of the thermometer required and obtained, it does this in harmony with, and in aid of, the ventilation, and does not make a difference of more than one degree Fahrenheit at the parts where the pictures are placed, between the temperatures before and after the gas is lighted.

Certain colour-tests, consisting of surfaces covered with white lead or with vegetable and mineral colours (especially the more fugitive ones), and in which also boiled linseed oil, magylp, and copal varnish were employed as vehicles, had been prepared, and were, when dry, covered one-fourth with mastic varnish, one-fourth with glass, one-fourth with both mastic varnish and glass, and one-fourth left uncovered. Sixteen of these have been placed for nearly two years in different situations, in some of which gas has been used, in others not. They give no indications respecting the action of coal gas (except injury from heat in one placed purposely very near to and above the gas burners); but seven of them show signs of chemical change in the whites, due to either a town atmosphere or want of ventilation. The most injured is that from the National Gallery, Charing Cross; and the next is from a country privy; the third, "much less changed," is from the House of Commons; the fourth is from the Barber Surgeons' Hall; the fifth from the Bridgewater Gallery; the sixth from the Royal Society's Rooms, Burlington House; the seventh from the British Museum.

The remaining tests, hung in—

1. Sheepshanks' Gallery, South Kensington,
2. Secretary's Room at South Kensington, where no gas is used,
3. Mr. Henry Drummond's Drawing-room at Albury Park, Surrey,
4. Sealed up and kept in a closet in the Secretary's Room at South Kensington,
5. Lambeth Palace, Vestibule of the Staircase,
6. British Institution, Picture Gallery,
7. Windsor Castle, room with a north aspect without gas,
8. Mr. Thomas Baring's Picture Gallery, 41 Upper Grosvenor-street, frequently lit with gas—

present no observable change in this respect.

Though apart from the especial subject submitted to the Commission, the Members cannot resist a recommendation that this kind of trial, which is especially a painters' experiment, should be continued for a longer period, and, indeed, be carried out on a more extensive scale.

* Hofmann.

The Commission think it right to state that they were unanimous on all the points to which their attention had been called, or which are referred to in this Report.

(*Signed*) M. Faraday.
A. W. Hofmann.
John Tyndall.
Richd. Redgrave.
Francis Fowke, Capt. R.E.

Photography in Colours: A Fragment. By a Member of the Edinburgh Photographic Society.

[The following paper is a republication, with a few slight modifications and additions, of parts of a paper read before the Edinburgh Photographic Society. The condensation and abridgement of the paper for insertion in the 'Photographic Notes' having caused their omission, and precluded more than a passing allusion to the processes which they described, which no one seems to have yet taken up or attempted to carry into practice, it seemed to the author that their republication in this more detailed and explicit form might be justifiable on the ground of giving our lithographic and other artists the opportunity of understanding more distinctly his proposed plans, and of giving them a fair trial, should they deem them worthy of it.

The author is aware that the plan or plans here proposed offer no contribution towards the solution of the scientific problem of colour-photography, understood as the getting of each coloured ray to leave an impression on the sensitive surface, which will reflect it, and it alone; but, however interesting must be this scientific problem, may it not still be the case, that processes of the nature now described, if found practically workable, may give a result of greater practical value than any modification of the scientific colour-photography to which our knowledge of chromatics and of optical chemistry yet points is at all likely in a hurry to yield? The author need not say that, unless the processes described had appeared to him to be of a practically workable nature, they would not have been now republished at length. He will say no more, but leave them to the judgment of those more competent to judge of their merits than one unacquainted with the practical details and working exigencies of chromolithography and its kindred arts can possibly be.]

Allow me to call the attention of artists, photographers, and the art-loving public to means by which a very close and practically satisfactory approximation to the long talked-about and wished-for nature-coloured photography may be attained. What I would suggest is the printing, after the plan of the well-known chromolithography, from a series or succession of stones, or metal or other plates, each one devoted to the production of one particular colour,—these stones or plates having, however, in the first instance been produced or prepared not altogether by the usual process for chromolithographic stones, but with the assistance of photography, by processes similar to or identical with those of Mr. Fox Talbot, M. Nièpce, Mr. Macpherson of Rome, Herr Pretsch, or any other process, whether of direct engraving by light, or etching on light-prepared plates or stones, deposition on photography-produced moulds, or any other process by which the results of Photography may be found transferable to stone or plate so as to yield an impression printable from.

To illustrate our contrivance. In applying Mr. Macpherson's process to the preparation of a set of stones for the printing of our photochromolithograph, we have to provide ourselves, before commencing operations, with the same number, both of stones and also of negative copies of the photograph to be photochromolithographed, as there are intended to be colours in the finished photochromolithograph; and we then proceed to block up in each of those photographic negatives, with china ink, lamp-black, paint, or other obstruction, before applying the photograph to its asphalt-covered stone (or at all events before we expose them together to the light), all parts of the photograph except those which belong to one particular colour, being the particular colour which the stone to which the said Photograph is applied is intended to print. (It is evident that we may also, if we please, print all the stones from one negative, by doing the blocking up, not on the negative itself, but on a transparent or translucent film placed above it: this plan might also be convenient, even where we have the full number of negatives, where alterations in the blocking are wished to be made.)

In the production of plates for colour-photography of this sort from metal and some other substances, and also in stone in some cases where other sensitives than asphalt or other solvents are employed, it may be necessary of course to modify our operations to some extent; but into these modifications we need not here enter, our object being merely to explain the general principles. To return to our photochromolithographic stones: we have made clear, we think, wherein they differed from Macpherson's *simply* photolithographic ones, and need not describe the processes of sun-exposure and etching wherein they agree. The stones being properly etched and ready for use, we have only to apply the colours and print from them as in the ordinary chromolithography. We have selected protochromolithography as the simplest variety of this process to begin with. A colour-photograph of the nature we have described will manifestly combine in one all the advantages of the well-known chromolithography, or similar process, with those of the photolithographic, photometallographic, photogalvanographic, or other process employed in the preparation of the stones or plates, whether that of Mr. Fox Talbot, M. Nièpce, Mr. Macpherson, or Herr Pretsch,

or similar process; and its superiority to that unfortunate hybrid production, the ordinary after-colour-plastered photograph, will also be sufficiently evident*.

In objecting to the ordinary after-coloured photographs, I must be understood to except those cases where a *faintly*-printed picture is made use of as the mere outline preliminary sketch for his work by a really tolerable artist, also collodion positives and daguerreotypes, &c., with a light colour-tinting. For portraits on a *small* scale our process in its *lithographic* form could perhaps hardly be expected to do otherwise than fall much short of the daguerreotype and collodion in minuteness; but in its *metallographic* forms, with the more fluid inks, this deficiency of delicacy might be to a great extent got over. (I may mention in passing that from photochromoxylography, or printing from a set of wooden colour-blocks, *engraved* from photographic impressions printed on wood, the wood having been sensitized by chloride or bromides or iodide or other silver preparation, or preparation of iron or uranium, or of ferrocyanides or *ferridcyanides*, &c. &c., very tolerable effects for certain purposes might be expected.)

For large-sized portraits and portraits enlarged to full size, it would answer well; and there is nothing I would like better to see than a set of landscapes, or of botanical or other natural-history subjects, brought out in this way. I am much mistaken if a set of ferns, &c., thus got up, would not throw the so-styled nature prints, beautiful in some respects as they are, pretty considerably into the shade; and, ornithologists and icthyologists, there is no reason why your friends should not be made to reappear in their full proper splendour not only of colour, but of silver and bronze and gold.

A few words to the makers, purchasers, and admirers of ornamental porcelain, and ornamental and useful crockery, and similar manufactures. Stones or plates of the nature we have been describing would, by printing from them, *not* with the ordinary coloured inks but with suitable preparations of the metallic oxides, metals, or other *fixed* substances, calculating, of course, beforehand, the effects of the colours as changed by the furnace's heat, afford us the means of producing a very beautiful colour-photography on porcelain, stoneware, glass, tiles, and all similar fabrics, and of, at a very moderate expense, rivalling if not excelling the fabulously costly manufactures of Sèvres. The stones or other plates might, if wished, be printed from directly; but infinitely the better plan would be the printing on paper, leather, or similar substance, and transferring the print in the usual manner to the porcelain or other fabric. I need hardly mention that one-coloured or black prints from photolithographs, or photometallographs, or photogalvanographs, if printed in the suitable materials, might of course be transferred in the same way; and geometric and kaleidoscopic chromolithographs (or kaleidoscopic photochromolithographs), colour-printed in the first instance in the metallic oxides, &c., ought to answer well. I may mention that, for printing on curved surfaces, as on vases, &c., we might have the paper, or similar materials from which the transfer is made, manufactured with a curved surface, the stones or plates from which the paper impressions are printed, and the photographic impressions from which these stones or plates have been etched having all also corresponding curves, and the original photographic negative having been taken on a curved surface without distortion, by the employment in our camera for this purpose of a lens giving the requisite amount of spherical curvature in the image.

I have talked of rivalling Sèvres; but I must plead guilty to the very bad taste of being no great admirer of Sèvres, which has always struck me as the misapplication of great labour and talent to the production of a comparatively poor *general* effect. But, not to enter into any controversy on that point, may it not be allowed that, for our utilitarian everyday crockery at all events, the portraits of kings, queens, and courtiers, &c., which figure in the Sèvres, might be advantageously replaced by designs of another character? Is there not something of irreverence allied to high treason in the carving away with profane knife and fork at, or in such immediate contiguity to, the throats and visages of royalty, wisdom, or beauty? Rather let us, studying a little the appropriate, decorate, say our dinner-table crockery, with all varieties of scaled and feathered game, and the ripe glories of the fruit-garden, orchard, and hothouse, "*non sine floribus*"; our coffee-cups with the dark glossy-leaved shrub, with its snowy jasmine bloom and coral fruit, and the mountain scenery of Jamaica or Ceylon, with the gracefully salaaming oriental, or grinning, free, woolly, and enlightened nigger cultivators; our teacups with the pretty little single white rose-blossoms and the appropriate foliage, and the whole process of culture and gathering by the quaint umbrella-headed Celestials, and subse-

* We have also described the process as having a separate stone or plate allotted to each colour; but, as in ordinary chromolithography, it may occasionally be convenient to make one stone (or metal plate) answer for more than one colour.

quent tipplement, either by themselves and their curiously small-footed daughters and better halves, or by their *antipodes*, our own fair countrywomen; or let us go with our camera into our lanes and hedges, for a good honest home-view of hawthorn and sloe undergoing the operation of leaf-stripping by a band of picturesquely ragged urchins, unmistakeable specimens of young Anglo-Saxondom. Finally, we may press into our service, not only the whole animal world as arked by Father Noah, and the whole upper-air subjects of Flora, but we may ransack all rivers and all seas, their shores, and depths, and caves, for sea-weeds, and rainbow-coloured fishes, sea-shells, and living flowers, and all the other fairy-like forms that deck the gardens and grottoes of the mermaids, reproducing them all with a life-likeness and felicity which even old Palissy never dreamt of; and besides all this infinite of scenery and life, have we not yet another infinite in the endlessly variable artistic arrangements and combinations of colours, or of colour and form, whether geometrical or plant-borrowed, which a fertile fancy, the polarization of light, or Sir Aladdin Brewster's magic kaleidoscope is ever ready to supply?

I might suggest applications of photograph colour-printing to our textile fabrics, wall-papers, &c.; but as this is rather out of my way, and pretty evidently follows from what we have laid down, I prefer leaving its development to the ingenuity of our manufacturers.

On Instantaneous Photography. By Henry T. Vickers, B.A.

Several months ago, at a conversation which took place among the members of the Photographic Society, at one of its meetings, in which the subject of instantaneous pictures was started, I stated that "*I had taken photographs in what I believed to be the one-tenth part of a second.*" The statement was at the time doubted by a professional photographer present; and, in order to test the matter, I set to work to construct the necessary apparatus for accurate experiment. What I stated was as a matter of belief; but now I am prepared to prove, as a matter of certainty, that I have taken photographs in the one-tenth of a second; and I am prepared also to prove that I have obtained a negative photographic impression in the one-hundredth part of a second.

Now I have not obtained this result by attempting to count the time (as the gentleman in question, being accustomed to the beating of his own metronome, may have supposed), but by taking a photographic impression of an object in motion, and moving at a known rate.

Before, however, more particularly alluding to the experiment, I must introduce to your notice the instrument which I have used for admitting the light on, and shutting it off from, the sensitive plate. The opening takes place at the centre of the lens by means of two perforated shutters, and the closing takes place by a continuance of the movement which is given to those shutters or disks for the purpose of opening. The only peculiarity or originality to which I lay claim on this part of the matter is, that the movement of both disks take place, and must take place, simultaneously.

There is no jerk from the commencement to the end of the operation, the trigger being so constructed that it can be drawn without the least disturbance of the camera; and there is a spring which prevents any secondary exposure after the shutters have once closed.

Now while the moving force of the spring is constant, and the resistance to that force, consisting of the *vis inertiæ* of the disks, and the friction, is also constant, it follows that the times of the passage of the disks over the given space must be constant. If, therefore, I once can ascertain the time that one picture can be taken in, I know the time of all taken with the same instrument. When I stated my belief that the operation was performed in the tenth of a second, it was from observing, as accurately as the eye can, the space that the image on the ground glass of a pendulum beating seconds travels while the machine is worked. But as an observation of such a short duration cannot be anything more than an approximation, and as the velocity of the pendulum at different points varies, it was my intention to construct a clock with a conical pendulum and a revolving dial, which could be photographed while in motion. On mentioning the matter, however, to my friend Mr. Grubb, he very kindly lent me the experimental clock which I now exhibit, and gave me permission to make such alterations as I might find necessary for my purpose. Accordingly, by regulating the fly-wheel, or fan, and weight, I caused a hand, to which there are two bright silvered beads attached, one in the centre, and one at the end, to revolve once in a second; and by placing the clock, while in motion, in the sun, I have succeeded in taking a photograph of the moving bead. I exhibit a positive proof of the original negative, and an enlarged drawing taken by measurement; and from these it will appear that, as near as possible, from the commencement to the end of the exposure occupied but the tenth part of a second, the accurate num-

bers being,—entire exposure, 0·1; full aperture, 0·06; diameter of luminous body, 0·01, or 0·00855, or $\frac{1}{117}$; and taking the diameter of the image of the moving luminous bead, and comparing it with the track which it has made, it appears that each part of that track was produced by a luminous body, which moved over it in the one-hundredth part of a second.

Now, having proved the proposition I started with, I would add a few words with regard to the difficulties to be encountered in taking instantaneous pictures, and I think these may be classed under two heads, viz. those arising from the peculiarity of the materials to be used, and those arising from the circumstances under which we have to use them.

With regard to the materials, in order to secure the utmost sensitiveness, the *chemical* affinities must be so nicely balanced that the faintest ray of light must be sufficient to change those chemical affinities; but when this is the case, other objects besides light produce that change, and dust and dirt here work mischief to their hearts' content; besides, it is necessary that the alcohol and ether should be most highly rectified; no water must be present; and this involves the consequence of speedy drying of the plates. This brings me to the circumstances under which we have to use them.

Now before any one commences to practice taking instantaneous pictures, particularly in this climate, I recommend him to arm himself with patience and perseverance. It is all very well to talk of a spring shutter and a pistol camera, but what satisfaction is it if, after waiting for the favourable moment to spring his shutter or fire his pistol camera, he finds, after applying half the developer in his dark box, and being half smothered in it to boot, that he has got nothing, and wherefore?—because his plate was too dry. No one, unless he has tried it, can know the feelings of a photographer as he stands with trigger in hand, after having exhausted all his skill and tact, and having succeeded in placing a perfect plate in his dark slide, watching, as he does, the passing cloud, while the plate goes on drying and the sportive gleam will not visit him to light up the view.

The celebrated instantaneous pictures of Le Gray have all been taken in the full blaze of sunlight, but by the uninitiated they are taken for moonlight scenes. They are taken in a climate superior to this for the purpose, and you may observe that he has not produced any with a very rough sea and clouds; the appearance of roughness of the water is such as would be produced by a swell. If it were produced by a gale, the clouds would have been moving fast, and the difficulty in hitting the proper moment for taking the picture would have been greater.

I exhibit two instantaneous pictures: in one the clouds will, I think, be admitted to be good, while the ripple of the sea is there too. The second is one of the Boyne Viaduct, and a little reasoning is necessary to find out that it is an instantaneous picture, as there are neither clouds nor sea. I exhibit also a picture of two horses and two men; though taken in a very short time, this picture is not an instantaneous one, but I exhibit it to show the advantage of instantaneous pictures, as part of it is imperfect from a slight motion of one of the animals. To the artist, I think, instantaneous pictures may be of the greatest use; there he can have the permanent and true representation of a moving object to study and copy from at his leisure, whether it be sea, clouds, or animals, or even likenesses of individuals.

And now with regard to the easiest mode of taking instantaneous pictures. For a long time I sought for a collodion of extreme sensibility, and the most sensitive which I ever used I made myself, and iodized with iodide of ammonium, but at the time of iodizing I put in a small bit of fresh-burnt lime, which had the effect of still farther removing the water and entering into combination with the free iodine by forming iodide of calcium; but this I have given up, in consequence of the lime accumulating in the bath and making the pictures streaky.

The best plan that I know of is that suggested by Mr. Barnes, viz. to use an ordinary sensitive collodion, and to develope with a strong iron developer, as if for a positive, and then to carry on the process with the pyrogallic developer; it was by this process that I obtained the negative of the revolving bead; the collodion had been mixed more than a fortnight, and the exposure took place under glass, and under circumstances where the angular aperture of the lens was much diminished.

On a New Dry Collodion Process.
By Mr. Alfred Nelson.

The dry collodion process I am about to describe, which is extremely simple in its manipulation, has also proved of great certainty in its results, as I think will be discovered by any one who may have a fancy to try it. In the first place, we have but one immersion in a silver bath; and, in the next place, only one washing is necessary.

Now, the nicety required in the quantity of water to be used on, as well as in, its application to a Fothergill plate, after its removal

from the silver bath, so as to produce a standard degree of sensitiveness, and in the Taupenot the two immersions in the silver bath, and the two washings consequent thereon, are decided objections to these,—not to say a word about the wrinkling and blistering of the film, so liable to occur in the dry process at present in general use.

These objections will, I think, be found in a great measure overcome in the practice of the new method.

Good, flat, 16-oz. glass will be found to answer exceedingly well. I say *flat*, because if there is a warp in it, breakage in the pressure frame is almost certain. When the plates are cleaned, on which there need not be one-half the care or time expended as requisite for other dry or wet processes, the chief thing to look to being the absence of dust, I coat them at my leisure with albumen, prepared thus:—

Albumen from fresh hen-eggs	8 oz.
Distilled water	2 oz.
Bromide of ammonium	16 grs.
Hydrochlorate of ammonium	1 gr.
Sugar of milk	3 grs.
Ammonia................	20 drops

Beat up to a froth in the usual way; let it settle for a night, and filter through a piece of sponge in a funnel into the stock bottle: a small bit of either camphor or charcoal is put into the mixture, which preserves it from getting bad. The way I proceed, so as to ensure perfect freedom from tails or streaks on the glass, is in this way:—I take two empty and clean wide-mouthed bottles; into one I put a glass funnel, having a piece of clean sponge, damped with distilled water, loosely plugged, into the neck of it. Through this I filter the albumen from the stock bottle, until wide-mouthed bottle No. 1 is nearly full; then change the funnel to the empty wide-mouth, and proceed to coat the plates from the full one, as if using collodion; but, instead of pouring the overplus back into the bottle, I pour it into the funnel, and so on, until No. 1 is empty. By this time No. 2 has received its quantum of albumen ready filtered to go on with; and the funnel is changed back again to empty No. 1, and so on until all the plates are done. As each plate is coated, and most of the superfluous albumen drained into the funnel, I stand it on a couple of folds of blotting-paper, with its face to the wall, one corner only touching: here I let them dry spontaneously, which they will do very soon if the room be dry and moderately warm; if it be too warm, the albumen will not flow so easily over the plate. No dust should be flying about or on the surface of the plate, as the smallest speck, as every photographer knows, is often the nucleus of a great stain. A large, loose camel's-hair brush is about the best for removing any particles of dust from the plate just before albuminizing.

The time expended in the coating of the plates is about the same as that saved in the cleaning of them.

When the albumen is dry, they may be stowed away as so many clean plates, ready for collodionizing at any time.

The formula for the collodion is as follows:—

Ether, sp. gr. 0·725	5 oz.
Alcohol, sp. gr. 0·800	3 oz.
Iodide of potassium	8 grs.
Iodide of ammonium	15 grs.
Bromide of ammonium	15 grs.
Pyroxyline	about 15 grs.

Or it may be made by mixing 2 parts of good negative collodion with 1 part of a quick-working positive, the film not too porous or too contractile. Coat with this on the albuminized side; let it set a little more than for the wet process, but not so much as that recommended for the dry ones, and immerse in the silver bath, made thus:—

Distilled water	10 oz.
Nitrate of silver	350 grs.
Glacial acetic acid	10 drops

The plate remains in this bath for four minutes; when taken out, it is put into a dish of distilled water, while another plate is being collodionized and plunged; the former plate is then taken from the distilled water, and washed for about three minutes under a rain-water tap, on the nozzle of which a piece of fine linen rag has been tied, so as to filter the water, and also to make it run smooth. *Do not spare the water*; then, to ensure freedom from all chance of foreign matter remaining on the plate, I flush it back and front with two or three drachms of distilled water, and it is ready for the drying box. Nothing is better for this than one made of tin-ware, or thin sheet-iron untinned (wood I do not like), the lid, of course, made light-tight; in the bottom about half-a-dozen folds of blotting-paper, and one or two open vessels of good commercial sulphuric acid in the middle. The glasses are put standing all round the inside of the box, with the prepared side next the tin, one corner only touching. The acid, having a great affinity for water, effectually removes moisture from everything in the box, thereby rendering the plates so dry that it will be found quite unnecessary to submit them to the action of ovens, or heat applied in any other way. If the acid have been used too often for this purpose, it becomes so impregnated with water as to cause it to absorb

any more very slowly, and dry the plate but imperfectly: a little heat, before putting them in the chases or otherwise packing them up, will then be useful.

The exposure in the camera is about one-half more than that required for the wet process under the same circumstances.

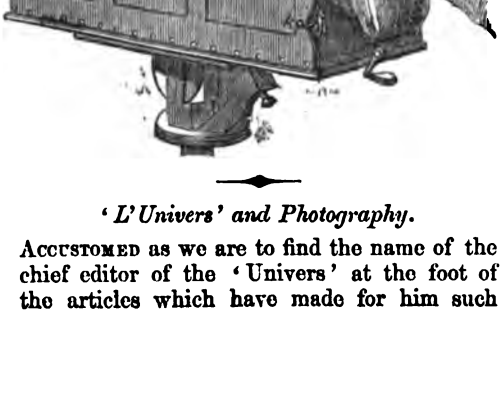
The development is conducted in this manner:—First wet the plate with dilute alcohol by pouring it over the collodion, and back again into the bottle; wash the spirit off with distilled water; and then, for the stereoscope size, pour on, from a clean glass measure, 4 drachms of the following developer:—

Distilled water	8 ozs.
Pyrogallic acid	12 grs.
Citric acid	3 grs.
Glacial acetic acid	1 drm.

When this fluid has evenly covered the film, pour it back into the measure, and add to it five or six drops of solution of nitrate of silver, 10 grs. to 1 oz. of water, and proceed with the development; when complete, wash as usual, and fix with solution of cyanide of potassium, 4 grs. to 1 oz. of water, or a moderately strong solution of hyposulphite of soda,—I prefer the cyanide: whichever I use, I do not experience the blistering and wrinkling of the film, so liable to occur during the last washing in some of the other dry processes. When well enough washed, dry and varnish, as usual for negatives.—*Proceedings of the Royal Dublin Society.*

Improvement of Cameras.

[Engraving referred to in Mr. Ennel's communication, in the 'Journal' for July, p. 5.]



'L'Univers' and Photography.

Accustomed as we are to find the name of the chief editor of the 'Univers' at the foot of the articles which have made for him such great and terrible reputation, we have been much surprised to find it at the bottom of an essay upon art, and still more surprised to find this essay beginning by an attack upon Titian, and finish by a still more formidable attack upon innocent photography, which Cosmos has always defended against its adversaries. For many individuals our friend Louis Veuillot is an oracle; consequently, for many, photography would be overturned from the throne upon which we have taken such pains to place it. Listen to the following:—

"I have read latterly, in reference to the able work of M. Pascal, that engraving has had its day, and that photography was going to supply its place. This possibility I pronounce to be quite impossible. I defy photography to produce anything resembling, or comparable to, the engraving of M. Pascal. Photography can never produce a portrait; neither can it succeed in rendering a copy of a picture or a monument.

"Everything has in itself a life, a physiognomy, which the artist only knows how to seize and express. The artist does not merely copy; he feels, he interprets, he explains, he makes us feel. How can the machine reproduce that which it feels not? If we cast a glance upon the photographs of the monuments of Rome (there are some admirable ones), and then examine the engravings of the same monuments by Piranesi, we shall see that the artist has seized upon the beautiful, the grand, and glorious truths, which the machine totally fails to accomplish. Make a photograph of the picture of Titian, which M. Pascal has just engraved: you will have a heavy exactitude, but no resemblance; there will be the same difference between this photograph and the engraving as between the first comer who should skim hastily through a fable of La Fontaine, and Delsarte, who should faithfully interpret it. The first produces but a platitude, while Delsarte makes you feel an inimitable 'chef-d'œuvre.' Each, nevertheless, pronounces the same words, halts at the same periods.

"It will happen to photography as to so many other grand inventions which aim at establishing equality amongst men: they vainly endeavour to suppress genius; and that same genius which they have pretended to replace will rank them quietly among things called useful!"

This attack is a rude one; it reminds us of the elephant, who crushes everything which his heavy trunk finds in its way. But the reply may perhaps be still more formidable. Evidently, when M. Louis Veuillot penned these lines, he had not condescended to see, much less examine, the portraits of MM. Severin

e Dusseldorf, of Nadar, of Disderi, of Le Gray, f Adam Salomon, &c. &c.; the copies of the ictures of Bingham, of Nichebourg, of Dubois e Nehaut, of Fierland, the monumental reproductions of Laurent, of Bisson, of Baldus, &c.

COSMOS.

Printing in the Dark—Moser's Images.

By the EDITOR of 'The American Journal of Photography.'

F a sheet of paper sized with starch be immersed in a solution of iodide of potassium, and hen dried, it gradually turns to a dark brown olour. This colouring may be so hastened by he influence of moisture and heat that it will each its maximum in a few minutes; but if he paper is thoroughly dried at first, it may e preserved in a pure dry atmosphere a considerable time without change.

If the iodized paper be pressed in contact rith an engraving or a photographic print, a istinct negative impression is produced—a rhite image on a dark ground. This image nay be fixed or intensified in a variety of rays.

These facts are probably familiar to most ersons who have practised the calotype process, and indeed often prove a source of annoyance.

The explanation of the phenomena is simply his: the colouring element is iodine, which, y the force of affinity, leaves the potassium or the starch, the starch for the material of he print. Instead of iodide of potassium, many ther substances might be used; the case I ave given is one of a numerous class. Any f the sensitive papers used in photography nswer the conditions. It is only necessary hat the paper be impregnated with a substance hemically affected, or decomposed, by the naterial of the object in contact. The image, f course, might not be visible, but may be nade so through means at the command of the hemist.

M. Niėpce de St. Victor has recently endeavoured, on the basis of some experiments rhich are easily referable to the category of he iodized paper, to demonstrate a new action f light. I am unable to find that M. Niėpce as added a single truth by his recent researches to our knowledge of the action of ight.

On May 17th I enclosed a piece of ammonia itrate paper, prepared in the usual manner, etween the leaves of a circular printed on oth sides. The sensitive paper, in order to eep it in position, was pasted at one end to he circular. The circular enclosing the paper ras then placed in one of the books of my library, and thus shut out from the light. The paper has been examined from time to time, until to-day (June 13). May 18th an impression began to be visible, but not on the silvered surface, and not of the printed surface in contact, but of the opposite side of the leaf. On the third day the impression began to appear on the silvered side, and of the surface in contact. In about a week impressions were distinctly visible on each side of the sensitive paper; the impressions being the images of both sides of the leaf of the circular, on the sensitive surface nearest,—the clearest impression of the inside being on the silvered surface, of the outside, on the back of the sensitive paper. To-day the impressions are clearest of the surface in contact on both sides of the sensitive paper. This case may be perhaps easily explained, and it presents some phases which have not been before observed.

In the year 1842 an announcement of a discovery was made, which awakened an interest in the scientific world almost as profound as did the daguerreotype three years before. Moser had found that "when two bodies are sufficiently near, they impress their images upon each other." Moser's experiments were everywhere verified, and were made the basis of curious theories. Moser himself attributed the phænomena to latent light, Robert Hunt to caloric, others to electricity, &c.,—some of these philosophers, I am persuaded, confounding conditions of success with the cause, as if we were to say that heat is the cause of the union of hydrogen and oxygen.

Certainly many cases of what are called Moser's images may be brought within well-known laws of chemical affinity. It is the main object of this paper to suggest that chemical affinity and the transference of volatile matter are sufficient to explain most cases; molecular changes, the rest.

I would take the experiment of the iodized paper as the illustrative example of the theory. The important circumstance in the example, and what is supposed in the doubtful cases, is the transference of matter from the object to the new image. Could the actual transfer of matter be made sensible to chemical tests, there would be little room for hypothesis and discussion. The question is one of probabilities.

To state the matter plainer: lay a penny on a freshly-polished daguerreotype plate; after some hours' contact, remove the penny, and it will have impressed its image, which becomes visible by breathing on the plate, or exposing it to the vapour of mercury. Here I suppose that matter from the penny is transferred to the silver, or *vice versâ*, thus rendering the

surface of the silver unhomogenous, as becomes manifest on applying the vapour.

The quantity of matter required to affect the deposition of vapour is extremely small. A fraction of a drop of oil, which is invisible to the naked eye, may render a large surface unfit for photographic use. The film of vapour is perhaps the most delicate of tests of the presence of matter. That solid matter is actually transported in cases similar to that above given, might be shown by many examples. Steel is composed of iron and carbon, two substances considered quite stable and involatile. To combine carbon and iron, the elements are placed by the side of each other and heated. The carbon passes over to the iron, and penetrates it to a considerable depth*. Mr. Johnson, our worthy treasurer, has shown how to make brass and other alloys, without melting one of the metals, and preserving its form throughout. It may be made to appear quite probable that all matter is volatile even at ordinary temperatures.

Mr. Grove and others have explained many cases wherein the Moser image is evidently dependent upon the transference of oily and other volatile matter from the object to form the nucleus of the image.

* The text gives the popular notion concerning steel. I am acquainted with the recent researches of Mr. Binks, which show that steel is probably a compound of iron, carbon, and nitrogen. Do the carbon and nitrogen enter the iron as cyanogen?

Determination of the Diurnal Amount of Light by the Precipitation of Gold. By JOHN C. DRAPER, M.D.

PLANTS depending to a great extent on the amount of light received for their growth and nutrition, it is very desirable that we should have means for the measurement of quantities of light, such as those we have for measuring heat. Those, too, who are engaged in photographic pursuits must have often desired to measure the amount of light of one day, compared with that of another, or of one portion of time compared with that of another portion. I shall not, therefore, need any excuse for introducing to your notice a process for the Determination of the Diurnal Amount of Light.

Various attempts have been made to construct a photometer which would accomplish such a result; and among the substances that undergo change under the influence of light, and which might serve the above purpose, is the peroxalate of iron, first suggested by Prof. Jno. W. Draper, in the 'Philosophical Magazine' for 1857.

On being exposed to light, peroxalate of iron gives off carbonic acid gas with effervescence, and gains the power of precipitating metallic gold from a solution of perchloride of gold—the quantity of gold precipitated depending on the amount of light to which the sensitive solution has been exposed.

The difficulty attending the use of this method is, that when the decomposition has fairly set in, the solution becomes turbid, owing to the precipitation of protoxalate of iron; this may, however, be remedied by adding to the peroxalate a little perchloride of iron, which mixture of peroxalate and perchloride may be exposed for a considerable time to the action of light, without any turbidity arising, and, on the addition of perchloride of gold, gives a precipitate of metallic gold. All that then remains is to weigh the gold precipitated, and we have represented the amount of light.

Preparation of the Sensitive Solution.—A measured amount of oxalic acid is boiled to saturation with freshly precipitated peroxide of iron. The resulting peroxalate is filtered, the filtrate being received in a test-tube containing a little perchloride of iron, and the contents of the filter washed until the mixture in the test-tube amounts to ten cubic centimetres, the quantity used.

In the following experiments, the above sensitive solution was exposed to a north light, or rather to the region about the pole, in a tube of thin glass $\frac{56}{100}$ of an inch in diameter, which was placed in a box darkened in the interior, so as to absorb all stray rays. Such an arrangement served to measure the quantity of light for half a hot summer's day,—a similar solution in a similar tube being substituted at midday.

As soon as the period of exposure ceased, perchloride of gold was added to the contents of the exposure tube, as long as it caused a precipitate. This precipitate was then collected on a filter, washed, dried, ignited, and weighed. The result indicated the comparative amount of light in the diffuse light of the period of exposure.

As examples I cite the following experiments:—

No. I.	Sept. 7th, 1858.		Perfectly clear.
Temp. 76°	Dew-point. 66°	Barometer. 29·68 in.	Gold precipitated. 56 milligrammes.
No. II.	Nov. 4th, 1858.		Very dark, and raining.
47°	46°	29·60 in.	7 milligrammes.

These experiments serve to show the

capabilities of the process, and may perhaps recommend a trial of its merits to such as are interested in photometric pursuits.

Colours for Photographic Painting.

As we advance towards perfection in the practice of photography, curiously enough, the desire increases for the introduction of the adornments of art. We are not quite satisfied with a picture perfect in all respects but one; and if we cannot by our science supply that one, we endeavour to do so by calling art to our aid. It is interesting and instructive to study the mutual assistance promised by the alliance of science and art in photography. The object of every true lover of sun-painting has been to render his camera-obscura a mirror of nature, in which he has the power of fixing the otherwise fleeting images. Advancing from the calotype, by the hundred steps, to the rapidity and the perfection of collodion, we now see the wishes of the early enthusiasts realized in all things save colour. From the delicate photographs which are now common amongst us, the artist is eager, perhaps too eager, to borrow the beautiful detail which ever charms by its finish and its minuteness. On the other hand, notwithstanding the discoveries of Becquerel and Nièpce, since we are not able to copy nature in the variety and charm of colour, the photographer is glad to receive the aid of the artist in imparting those tints which so greatly increase the beauty of his picture. Seeing that more than fifteen years have passed since it was boldly stated that photographs coloured by the solar rays were a possibility, and yet they are not produced, many may infer that the difficulties of fixing the impressed colours are so great as to render the desideratum improbable. It is to be regretted that there is, at the present time, scarcely an experimentalist in this country whose attention is turned to the production of chromo-photographs. Charmed by the facility of collodion, which renders the production of an almost perfect picture the easiest possible thing, they care not to wade through all the difficulties, or to encounter the disappointments, which stand in the path of the inquirer; consequently, that which has been effected by Becquerel and by Nièpce (both of whom have succeeded in producing copies of nature in colours, perfect in all respects, save that the tints were fleeting), is left without examination, though the promise of reward is high.

The artist is summoned to the aid of the photographer; and great have been the improvements within a few years in the application of colour to the sun-drawn picture. While we were yet endeavouring to improve the calotype, numerous experiments were made in the application of water colours, and even of oil colours, to the paper. None of these were, however, very successful; indeed it was only where the artist has been satisfied to allow the photograph to tell its tale, *through* his transparent colours, that any pleasing effect could be obtained. The collodion pictures introduced new conditions; and they are but few who have succeeded in rendering those pictures pleasing by the addition of their colours.

It has been to portraits chiefly that the artist has turned attention; and since the profession of the miniature painter has been so deeply trenched upon by the photographic artist, numerous well-skilled painters on ivory have directed their attention to this branch of art; and now we meet with photographic portraits finished with all the minute delicacy of the ivory miniature. But even if we select examples of the most effective of these productions, we shall find that they are of very varied degrees of excellence. In many of them the original photograph is entirely obliterated; it, indeed, has served no other purpose than that of a mere outline, over which the painter has disported at pleasure. The consequence of this is, that the likeness is frequently very much modified: in some cases, it may be improved—for a skilful artist can remove a frown, or dispel the gloom which falls upon some faces in repose; but in the majority of examples the artist does not improve that which the camera-obscura has done, and in many the truth is sacrificed to the conventionalities of the school in which the artist has been trained. The perfection of a coloured photographic portrait consists in the preservation of all that chemistry and physics have effected, superadding those tints which will more nearly represent nature.

It will of course be understood that we speak of a portrait as perfect as photography can render it—a portrait obtained in from two to three seconds upon a perfect collodion film, by means of a lens which shall be truly achromatic, and free from all the defects arising from spherical aberration. These defects may not be entirely removed; but they can be reduced to such limits as to be scarcely appreciable. Again, the photographer must be an artist who, while he disposes his sitter so as to avoid any wide differences in the focal lengths of the several parts of the object, shall secure ease of position and artistic effect. The arrangement, too, of his light shall be such as to give no deep and unnatural shadows to the face. By attention to these and other points, which need not be referred to, a good photographic

portrait being produced, the problem to be solved is, to colour it.

We have been examining the colours prepared by Mr. Newman of Soho Square, the well-known artist colourman; and it appears that the principle adopted by them in the preparation of colours for photography, and in the application of those colours, ensures the best possible effect. The general views will be found in a little publication issued by this house, entitled, "*Harmonious Colouring in Oil, Water, and Photographic Colours, especially as applied to Photographs.*" It is not quite easy to give a correct description of the mode of applying those colours to a collodion portrait, so as to render it intelligible to those who are not familiar with the processes of colouring on glass; we must, however, endeavour to do so. A perfect photographic portrait being obtained in the usual manner, the dry colours are applied by a soft rubbing motion, with a short camel-hair pencil, on the side covered with the collodion; the application of the colour depending, of course, on the judgment and skill of the artist. These colours do not appear on the other, or the uncollodionized side of the glass plate, the darkened argento-collodion surface being tolerably opaque. When it is considered that a due amount of colour has been applied to the portrait, the plate is gently warmed, and then it is flooded on the painted side with a penetrating spirit varnish. The result of this is, that the colour is carried, and diffused, through the darkened collodion, and appears beautifully clear, but with a softened character, on the other side. It now is seen through the glass, and although any required intensity of colour may be applied on the *back* of the picture—as we will call the collodion side of the plate—it will appear through on the other side, the minutest details of the photograph being undisturbed; careful examination, indeed, shows that every line, however minute it may be, is brought out with somewhat increased effect, colour being thoroughly diffused through it. The picture may be regarded, in some respects, as dyed; for, although there is no such chemical combination between the colour and the photographic picture as that which takes place in a dyed fabric, yet the penetrating varnish so completely diffuses and, in drying, fixes the colours, that a result in all respects analogous is produced. The advantage of this process is that colour can be again and again applied with the penetrating spirit, until any depth of tone is secured; and yet the perfection of the original picture is preserved. Many of the pictures which we have examined have displayed in a striking manner the correctness of this principle of colouring the collodion photographic portrait. With all the exquisite finish of the most perfect ivory miniature, these portraits possess a perfection which those could never reach. The delicate pencil of the sunbeam has drawn with unerring fidelity lines which no artist could describe with his pencil: consequently the texture of every part of the dress, the condition even of the skin, and the physical state of "each particular hair," remain preserved, so as to bear very high magnifying power, while the brilliancy of colour is given to the whole. An effect is obtained in a few hours upon these photographs which could not be reached by days of the most laborious application on ivory.

We have also examined the effect of a gelatinous solution prepared by Mr. Newman, in aiding the diffusion of colour on albuminized and on salted paper. Not only does this preparation enable the artist to spread his colour freely over the paper, but, as it dries, it so perfectly fixes the colour, that a second colour can be readily washed over the first. Many of the stereoscopic views which we saw had been painted with this preparation; and they were all of very high merit.

We cannot refrain from alluding to some experimental trials which have been made by the Messrs. Newman for *tinting* large photographs on paper. The results were of the most pleasing character; and although there appear at present to be some difficulties in the way of preparing the liquid colours employed so that they may be kept for sale, we trust these will soon be overcome, when we shall have pictures which can only be rivalled by such as may be coloured from Nature's own palette by the solar pencil.—*The Art Journal.*

DRAWINGS OF RAFFAELLE AND MICHAEL ANGELO.

THE Oxford collection of original drawings by Raffaelle and Michael Angelo, are being publicly exhibited for a time at the South Kensington Museum. They have been brought to London mainly for the purpose of being photographed for the use of government schools of art, and also for general publication. The Department of Science and Art has for a long time been engaged in procuring photographs, casts, &c. of fine works from foreign museums and private collections, for circulation amongst students in connexion with it, at low tariff prices; but it has perhaps not been generally known that these reproductions may also be obtained by the public from the producers on scarcely less favourable terms. The department and the authorities of the British Museum are now, however, jointly engaged in organizing this system on a more extended and systematic

basis; and we understand that an exhibition-room will very shortly be opened at South Kensington, in which all the photographs, casts, electrotypes, &c. produced under the authority of both these establishments will be exhibited, and made available for direct sale to the public. In the mean time, some repairs were being made in the University Galleries at Oxford, which necessitated the temporary removal of the Raffaelle drawings; and on an application from the Department of Science and Art, the University authorities at once liberally consented to their removal to London, and to photographs being taken of them. In addition to the original drawings from Oxford, several very interesting ones of both Raffaelle and Michael Angelo have been lent by private individuals, and an extensive series of photographs and fac-simile engravings from others in English and foreign collections will shortly be added; so that it is probable that in one shape or other three-fourths of the drawings of Raffaelle now extant will be represented at Kensington. Of the photographs, the most important are those from the Cartoons at Hampton Court, specially executed for Government by Mr. Thurston Thompson. Although this splendid series, far excelling any previous attempts, has been ready for publication for several months past, they have been kept in abeyance, owing to the immaturity of the general arrangements for sale to the public, and are now for the first time being exhibited. In the next place should be specified the photographs from drawings preserved in the British Museum. The Prince Consort has contributed the collection of photographs of drawings by Raffaelle and his scholars, from the Windsor collection, and we believe has sanctioned their being issued to the public. The Chatsworth collection, by permission of His Grace the Duke of Devonshire, is also represented by Mr. Thompson's excellent photographs. These and the foreign series, however, are unavoidably withheld from exhibition for a short time, pending the completion of the new galleries. Of the drawings preserved in continental collections, those from the Museum of the Louvre, executed by permission of the French Government, for the Department of Science and Art, are entitled to the first rank. After these should be noticed the splendid series comprised in the Archduke Charles's collection, at Vienna; those from the Museum of the Academy at Venice, and from the Florence Gallery; and, finally, the fac-simile engravings from the Wicar collection at Lille, and numerous miscellaneous fac-similes from various other sources. The original drawings of Raffaelle and Michael Angelo now exhibited number 289; and of photographs and fac-similes ready for exhibition, but not yet hung, it is expected that the number will be still further augmented. Finally, we believe we may announce that it is the intention of the Department of Science and Art to endeavour to procure photographs of all the drawings of these two great masters which are known to exist in England; and we trust that the private possessors of these inestimable treasures will coöperate, in order that an intention so important to the artistic world of Europe may be effectually carried out. It should be added that the collection has been temporarily placed in the new galleries constructed for the reception of the Turner and Vernon pictures, and that the public will now, for the first time, have an opportunity of testing the efficiency of these new buildings as respects the mode of lighting and ventilation.—*Athenæum.*

To the Editor of the Photographic Journal.

168 New Bond Street, August 6, 1859.

Sir,—It has been asserted several times in print that Col. James *originated* the process of reducing maps by photography. This, I think, can be proved to be an error, as the firm of which I am a member copied several maps of the Crimea for Prince Albert in the year 1854.

I mention this because I have lately been employed to *enlarge* the Austrian Government map of the Lombardo-Venetian Kingdom, a copy of which I enclose; and, as I have not heard of this having been done before for publication, I wish to place the fact on record, lest this small honour may also be claimed for some other photographer.

I send you moreover a reduction of the same map, similar in size to that produced by Messrs. Bisson. Both were executed for Mr. Stanford of Charing Cross.

You would confer a benefit on photography if you would draw the attention of engravers and lithographers to the great accuracy and expedition with which the enlargement or reduction of any drawing can be accomplished.

George Downes.

[On reference to the beauty of Mr. Downes's productions, the 'Athenæum' says, "While speaking of maps, we should announce that we have before us some specimens of photographic reproductions of maps, executed by Mr. George Downes. These show yet another application of this most wonderful and beautiful art. The sheets reproduce for us an Austrian official survey of Lombardy, enlarged or diminished to any size at the will of the operator, yet with a perfect fidelity of lines, names, surfaces, mountain shades, and the like. We have never seen a more beautiful map."—Ed.]

Transfer Liquid.

To the Editor of the Photographic Journal.

114 High Holborn.

Sir,—Having worked hard for two years transferring positive collodion pictures to leather, cloth, &c., I take the liberty of sending you these few lines, hoping it may save some of your readers time and disappointment. I have used alcohol and muriatic acid, alcohol and nitric acid, alcohol and ether, and a weak spirit-varnish (Delahaye's), all of which succeeded perfectly well in removing the collodion from the glass, quite free from air-bubbles or any defect whatever. Collecting a number of specimens taken with the above mixtures, I pinned them up in a glass case; a few weeks after, they all began gradually to turn brown, from the oil in, or the greasy nature of, the leather and cloth, no doubt assisted *very much* by the acids; and finding them perfectly useless, I have discontinued the practice.

Edward E. Massey.

"Mr. Rejlander, the well-known photographer, perhaps the most successful deviser of original figure-groups in the new art, has just brought out an admirable study, that he entitles 'The Wayfarer.' It is admirable in light and shade, in broad daylight effect, and in exquisite detail. It is, in fact, an Italian picture perfected with Dutch truth. It represents an old English labourer in the smock-frock of the period. He is on his way, we suppose, to fulfil that cheerful task of the latter days of an old labourer, to claim his parish; and seated beside a heap of wayside stones, from which a clump of nettles springs, he is calmly, with stolid meditation, eating his humble meal. The light and dark blocking out of the stones, the dark-netted veins of the leaves that shadow the old man's bundle, are both admirably given; so are his buttoned (rather too trim) gaiters, his knotty stick, and broad, smooth hat. The purply tone of the photograph is very soft and soothing to the eye, and the lucid sunny transparency of the middle tint is a study for a painter. There is exquisite finish and work, too, about the plaited breastplate of John Anderson's smock-frock, as well as about the little quilled plaits and foldings that run like armlets round the wrists. The veined hands are beautifully given; and, indeed, the whole thing is a triumph of photographic arrangement and manipulation."—*Athenæum.*

ANSWERS TO CORRESPONDENTS.

Mr. Fry informs us that he purchased Mr. Fox Talbot's 'Pencil of Nature' on its coming out, but that he never had the pleasure of seeing the 'Sun Pictures in Scotland,' and was in ignorance that such a work had been published.

A. C.—We have never seen the dark tent, and cannot advise you as to which is the better.

60 Bridge Street, Birkenhead.
July 27, 1859.

Dear Sir,—I observe in your Notices to Correspondents that you were ignorant of the existence of the Exchange Club as per within memoranda. We have exchanged upwards of 600 pictures, but, I must confess, members have not sent me any for a twelvemonth; so the principle of periodical exchanges has been abandoned, and I exchange whenever any fresh ones come in, as I have a good many on hand, and some very fine ones. I am not particular about the 2*s.* 6*d.* as long as stamps are sent to cover the return-postage; and, for my trouble in the matter, the best producers must be content to be satisfied with my own exchanges for some of their productions, though I think on an average, even in this way, there has not been injustice.

Christopher Bell.

Committee.

Christopher Bell, Esq., 60 Bridge Street, Birkenhead.

Charles Corey, Esq., 5 Slater Street, Liverpool.

G. R. Berry, Birkenhead.

RULES AND REGULATIONS
OF THE
LIVERPOOL AND NATIONAL PHOTOGRAPHIC EXCHANGE CLUB.

Associated for the purpose of receiving and exchanging Photographs between its Members.

Those only to be considered members who shall intimate their intention in writing to the Secretary, and at the same time transmit a subscription of 2*s.* 6*d.* in postage stamps, to cover the expense of printing and transmission of rules, &c.

The photographs for exchange to be transmitted per post prepaid to the Secretary, not mounted on cardboard, but rolled round a thin, light, (if possible) hollow rod, and an amount of stamps enclosed to prepay return postage. The Committee would suggest that each member have his or her name and address legibly written on the rod, so that trouble may be saved to the Committee when they make up the exchanges.

The Committee will endeavour to allot to each member photographs of an equal quality to those transmitted, and a register will be kept in which will be entered the number, subjects, name and address of each sender, and the name of subjects exchanged. Therefore it is requested that the name of the photographer and the subject of the picture be attached firmly to each picture.

The exchange will be effected once a month, or according to the number of pictures in the hands of the Committee.

If any extraordinarily fine or large proofs be sent for which no equivalents may be found, notice will be given and attention called to the subject through the medium of the London and Liverpool Photographic Journals.

C. Bell.

Those correspondents who have not already been replied to by Post shall receive due attention in our next.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. Taylor and Francis, Red Lion Court, Fleet Street, E.C.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 89. SEPTEMBER 15, 1859.

Photogalvanography, or Nature's Engraving.

By Herr Paul Pretsch.

With the present Number of this Journal we present our readers with the copy of a photograph, taken from life by Mr. O. G. Rejlander, and printed with ordinary printers' ink from a copper plate executed by the above-named process. The same is a combination of a photographic process with the electrotype; and a description of it has been given in Nos. 75 & 76 of this Journal. We will therefore here only repeat the general outlines of it, and enter presently into a few details concerning the peculiarities of the little plate before our readers.

A mixture of gelatine and photogenic chemicals is spread on a levelled clean plate of glass, and dried. The transparent original is placed on the surface of this dried coating, fixed in an ordinary copying-frame, and in this mode exposed to the influence of the light. After sufficient exposure—known by experience—the plate is taken from the frame, the original separated (not damaged at all), and we perceive now the image photographically reproduced on the coating of the glass plate; it is, in fact, a kind of weak negative, because the light has acted upon the coating more or less, or not at all, corresponding to the portions of lights and shadows in the transparent original. Such a picture would be of no use for printing with ordinary printers' ink, because for this purpose we want either a raised or intaglio surface. Therefore the coated glass plate with the photographic picture thereon is brought into a bath, where the picture is almost instantaneously developed in a brighter colour, and becomes raised in a brilliant granulation, corresponding exactly to the shadowy portions of the picture: that is to say, all the parts of the picture (the blacks and shadows of the original) where the light has not acted upon, or very little influence, used *swell*, become granulated and raised; while all the parts of the picture where the light *has* acted upon (the whites and lights of the original), are darkened and hardened, and remain unattacked, or very little attacked, by the solution of the bath.

This beautiful granulation, so necessary for any printing-purpose, is a peculiar advantage of this process, and can be regulated partly by the mode of making the coating thinner or thicker, and partly by shortening or prolonging the time of exposure; the colour and transparency of the original have also some influence in the production of these granula.

The nature of the formation of them has not been scientifically investigated; but it seems quite certain that bichromate of potass alone, mixed with gelatine, cannot produce them. This has been perceived by some distinguished investigators in England and in France; and they have been obliged, for the purpose of obtaining the necessary granulation, to apply artificial means. They have used either the aqua-tint ground, so well known to copperplate engravers, and consisting of a resinous substance, spread over the surface and melted by gentle heat, or they have produced these granula photographically by a kind of screen, or second original. Therefore I can only repeat that the bichromate of potass is not capable of producing this necessary desideratum.

Having obtained by means of photograph the picture on the coating of the glass plate—and which is not only visible to the eye, bu also raised and perceptible to the touch, representing, in fact, the reverse of an intaglio print-

ing-plate,—the remaining portions of the process are merely mechanical, although they require some care and experience. A mould is taken from the picture, consisting of a mixture of gutta percha with oil, and some greasy and resinous substances. The surface of this mould is then made conducting to electricity, and brought into the electrotype apparatus for the purpose of obtaining a copy in a firm and solid sheet of copper. The picture on the coated glass plate being raised, the mould is consequently sunk, and this first copy in copper appears therefore raised again. For this reason it is necessary to copy by electrotype this first copper plate, called the matrix, for the purpose of obtaining ultimately the intaglio copper plate to print from.

To some of our readers, less experienced in the printing arts and in technical pursuits, this mode may appear perhaps tedious or uncertain. However, this is not the case, as many will understand who are obliged constantly to use similar processes—for instance, for multiplying engraved steel plates for illustration of books and newspapers, or for bank-notes, share-scrips, &c. As a test of what can be done by the process of moulding and electrotyping, and as a triumph of the printing arts, I possess a specimen of some parts of plants, printed with ordinary printers' ink from an electrotyped plate, executed by the nature-printing process. The beauty of the print can only be appreciated by means of a magnifying-glass; the naked eye cannot perceive it; and many people would scarcely believe that such perfect and minute representation of nature can be printed.

From engraved copper plates we can make direct copies by the electrotype; but it is well known that iron and steel cannot be placed in a solution of sulphate of copper; cyanide of copper does not answer so well in the electrotype process, and a deposit of silver is rather expensive; therefore moulds of a mixture of gutta percha are generally taken from those plates. Formerly plumbago was chiefly used for making them conducting; and although this substance is still used in many instances with great advantage, nevertheless for moulds of very fine and subtle designs it has been found that a film of reduced silver is undoubtedly preferable, especially since the mode of applying this film of silver and reducing the same has been improved.

Having given a general outline of the process, we will proceed now to the peculiarities of the small plate, copies of which are presented with the present Number. The photographic original is taken by the well-known and distinguished photographer, Mr. O. G. Rejlander of Wolverhampton. The scene and representation is thoroughly English; familiar faces and homely-looking personages are before our eyes; and if the conception and arrangement of the figures do not express a heroic, romantic, or poetic action, still I think many people will not be dissatisfied by looking thereon. The maid is not so pretty as the servant-girl in the print, "Please, sherry, sir?" The man on the right hand is executing the privilege of every Englishman, "to grumble, and to pay;" but he is interrupted by the generosity of a man of the people, who is searching in his pocket for some money, crying, "I pays." The phlegmatic and composed features of the one are contrasted with the expression of the other; and although the latter is only clad in the costume of a common wayfarer, still his head possesses a form fit to be put on the shoulders of a "Roman warrior."

The photograph as well as the copper plate have not been executed expressly for this purpose and for this Journal; both of them were executed a few years ago; therefore this specimen does not represent a *perfect* specimen of the art of "Nature's Engraving." It will only direct the attention of the public again to this mode of making photography popular; of bringing her productions to every house, every cottage, and perhaps to every library; of making photographic pictures lasting and durable for centuries, and raising the photograper to the rank of an author. I am of opinion that "Nature's Engraving" has been treated somewhat harshly—not by the public, but by certain persons who lay claim to an exclusive right to provide the people with photographs: but I still trust to the good sense and discrimination of an impartial public. I still consider England as especially fit for carrying out such an important enterprise, although France has taken the lead in stimulating the exertions of individuals in this direction. It is well known that the Duc de Luynes has offered, besides the prize for the best mode of producing durable positives by means of photography, another prize for the best mode of multiplying photographs by any method of printing with ordinary printers' ink. Most probably in a few months the public will be informed of the results of this decision; but although nobody can know exactly who will be at the head of the competitors, still it is to be hoped that England will have its due share of representatives amongst the competitors rewarded.

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objects of all branches of art, have been executed—landscapes, architecture, figures, portraits, taken from Nature, imitations of ancient and modern drawings with chalk, pencil, pen and ink, copies of etchings, &c. Any person who is particularly interested therein can see impressions from these plates at my house, as also the various stages of the process itself, and some impressions from plates absolutely *untouched*.

And now a few words regarding the *touching* of the plates. It has been referred to, in detriment of the method, that some of the plates have required, and have been *touched up*, as it is technically termed, by an engraver. This is true, but only to a very small extent, such as the correction of faults and imperfections during the process, or in those parts where deficiencies exist in the original for the production of a pleasing picture,—for instance, in the sky, or when the foliage has been moved, or some portions in the foreground are not sharp enough, or where the whites and blacks show too much contrast, &c. I can confidently assert that the real beauty in these plates does not consist in those parts which have been added or done by the engraver. Truth and faithfulness are still perfectly preserved; and *they* always form the peculiar superiority of the plates executed by this process, in addition to the brilliancy of details, which cannot be accomplished by human hand.

Some months ago I published, in a contemporary periodical, one of my plates printed from stone; that is to say, an impression from one of my copper plates, executed with a peculiar sort of ink, was transferred to stone, and the copies, a few thousands in number, were printed by the common lithographic process. It is obvious that by these means the original copper plate remains in a perfect condition, and any number of impressions can be executed at a very cheap rate. In many instances this mode of printing answers perfectly well, and the more so, as there can be added some tints to the plate, either uniform or variously coloured, and the appearance of the picture more or less improved. Some of the pictures, however, especially where there are many blacks, or chiaroscuros, do not look so well from a transfer on stone—they lose some of the details in the dark portions. The present plate is printed from the original copper plate; but, some thousands of copies being required, this copper plate would not have been able to stand the required number of impressions. It would have been easy enough to produce, by means of the electrotype process, several plates, and to print from each plate only a certain number; but this mode would have increased the expenses of the publication. We have taken, therefore, advantage of the kind offer of M. Joubert, the inventor of the "Aciérage," or the mode of coating the surface of any engraved plate with iron. The copies before our readers are all printed from one and the same copper plate, coated with iron by M. Joubert. A subsequent article, written by the inventor, will more fully explain the *modus operandi* of this process and its advantages.

Impressions of this plate on India-paper would have been far superior; however, we trust to the kindness of our readers, considering that this is one of the first experiments to apply this mode of engraving to the publishing of a photographic picture, printed with ordinary printers' ink, in considerable number, and at moderate expense.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

On a Method of rendering engraved Copper-Plates capable of producing a greatly-increased number of impressions. By F. Joubert, Esq.

The art of representing objects by means of outlines cut into solid stone or metal, appears to have been practised from the remotest antiquity; the Nineveh inscriptions recently brought to light, the numerous monuments left by the Egyptians, their vases of gold and other metals, covered as they are with a variety of inscriptions and designs cut in deep intaglios, sufficiently prove the fact.

We have also the positive knowledge that precious metals, even steel, were frequently engraved upon by the Arabs, long before their civilization penetrated into Europe: their arms especially, and many splendid pieces of armour bearing elaborately-cut designs and ornaments, are evidence of this. The Greeks, and in after times the Romans, practised the art of engraving on stone and metal extensively. Gem or precious-stone engraving, to the origin of which it is difficult to assign a period, was cultivated by the Romans with a degree of perfection which has never been surpassed.

ing-plate,—the remaining portions of the process are merely mechanical, although they require some care and experience. A mould is taken from the picture, consisting of a mixture of gutta percha with oil, and some greasy and resinous substances. The surface of this mould is then made conducting to electricity, and brought into the electrotype apparatus for the purpose of obtaining a copy in a firm and solid sheet of copper. The picture on the coated glass plate being raised, the mould is consequently sunk, and this first copy in copper appears therefore raised again. For this reason it is necessary to copy by electrotype this first copper plate, called the matrix, for the purpose of obtaining ultimately the intaglio copper plate to print from.

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And now a few words regarding the *touching* of the plates. It has been referred to, in detriment of the method, that some of the plates have required, and have been *touched up*, as it is technically termed, by an engraver. This is true, but only to a very small extent, such as the correction of faults and imperfections during the process, or in those parts where deficiencies exist in the original for the production of a pleasing picture,—for instance, in the sky, or when the foliage has been moved, or some portions in the foreground are not sharp enough, or where the whites and blacks show too much contrast, &c. I can confidently assert that the real beauty in these plates does not consist in those parts which have been added or done by the engraver. Truth and faithfulness are still perfectly preserved; and *they* always form the peculiar superiority of the plates executed by this process, in addition to the brilliancy of details, which cannot be accomplished by human hand.

Some months ago I published, in a contemporary periodical, one of my plates printed from stone; that is to say, an impression from one of my copper plates, executed with a peculiar sort of ink, was transferred to stone, and the copies, a few thousands in number, were printed by the common lithographic process. It is obvious that by these means the original copper plate remains in a perfect condition, and any number of impressions can be executed at a very cheap rate. In many instances this mode of printing answers perfectly well, and the more so, as there can be added some tints to the plate, either uniform or variously coloured, and the appearance of the picture more or less improved. Some of the pictures, however, especially where there are many blacks, or chiaroscuros, do not look so well from a transfer on stone—they lose some of the details in the dark portions. The present plate is printed from the original copper plate; but, some thousands of copies being required, this copper plate would not have been able to stand the required number of impressions. It would have been easy enough to produce, by means of the electrotype process, several plates, and to print from each plate only a certain number; but this mode would have increased the expenses of the publication. We have taken, therefore, advantage of the kind offer of M. Joubert, the inventor of the "Aciérage," or the mode of coating the surface of any engraved plate with iron. The copies before our readers are all printed from one and the same copper plate, coated with iron by M. Joubert. A subsequent article, written by the inventor, will more fully explain the *modus operandi* of this process and its advantages.

Impressions of this plate on India-paper would have been far superior; however, we trust to the kindness of our readers, considering that this is one of the first experiments to apply this mode of engraving to the publishing of a photographic picture, printed with ordinary printers' ink, in considerable number, and at moderate expense.

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On a Method of rendering engraved Copper-Plates capable of producing a greatly-increased number of impressions. By F. Joubert, Esq.

The art of representing objects by means of outlines cut into solid stone or metal, appears to have been practised from the remotest antiquity; the Nineveh inscriptions recently brought to light, the numerous monuments left by the Egyptians, their vases of gold and other metals, covered as they are with a variety of inscriptions and designs cut in deep intaglios, sufficiently prove the fact.

We have also the positive knowledge that precious metals, even steel, were frequently engraved upon by the Arabs, long before their civilization penetrated into Europe: their arms especially, and many splendid pieces of armour bearing elaborately-cut designs and ornaments, are evidence of this. The Greeks, and in after times the Romans, practised the art of engraving on stone and metal extensively. Gem or precious-stone engraving, to the origin of which it is difficult to assign a period, was cultivated by the Romans with a degree of perfection which has never been surpassed.

to protect it from wear while printing, but it is only lately that this important object has been attained.

In March last, my friend M. Jacquin, of Paris, took out a patent in this country for a method of coating plates with iron, which had already been successfully applied in France, and of which the merit is due to my friend M. Henri Garnier, of Paris.

I have myself had the advantage of co-operating with M. Garnier in the development of the invention, the principles of which I shall now proceed to describe.

If the two wires of a galvanic battery be plunged separately into a solution of iron, having ammonia for its basis, the wire of the positive pole is immediately acted upon, while that of the negative pole receives a deposit of the metal of the solution; this is the principle of the process which we have named "acierage."

The operation takes place in this way:—By placing at the positive pole a plate or sheet of iron, and immersing it in a proper iron solution, the metal will be dissolved under the action of the battery, and will form hydrochlorate of iron, which, being combined with the hydrochlorate of ammonia of the solution, will become a bichloride of ammonia and iron. If a copper plate be placed at the opposite pole and likewise immersed, the solution being properly saturated, a deposit of iron, bright and perfectly smooth, is thrown upon the copper plate, from this principle:—

Water being composed of hydrogen and oxygen;

Sal ammoniac being composed of—

1st. Hydrochloric acid, containing chlorine and hydrogen;

2nd. Ammonia, containing hydrogen, nitrogen, and oxygen;

The water is decomposed under the galvanic action, and the oxygen fixes itself on the iron plate, forming an oxide of iron; the hydrochloric acid of the solution acting upon this oxide forms a hydrochlorate of iron, whilst the hydrogen precipitates itself upon the plate of the negative pole, and, unable to combine with it, comes up to the surface of the solution in bubbles.

My invention has for its object certain means of preparing printing surfaces, whether for intaglio or surface printing, so as to give them the property of yielding a considerably greater number of impressions than they are capable of doing in their ordinary or natural state. And the invention consists in covering the printing surfaces, whether intaglio or relief, and whether of copper or other soft metal, with a very thin and uniform coating of iron, by means of electro-metallurgical processes. The invention is applicable whether the device to be printed from be produced by engraving by hand, or by machinery, or by chemical means, and whether the surface printed from be the original or an electrotype surface produced therefrom. I would remark that I am aware that it has been before proposed to coat type and stereotypes with a coating of copper, to enable their surfaces to print a larger number of impressions than they otherwise would do; I therefore lay no claim to the general application of a coating of harder metal on to the surface of a softer one, but my claim to invention is confined to the application of a coating of iron by means of electricity on to copper and other metallic printing surfaces.

In carrying out the invention the solutions of iron employed may be varied, and such is the case in respect to the arrangement of the galvanic battery or other source of electric currents used; I do not therefore limit the invention to the means hereinafter described, but I believe they will be found to be the best for the purpose.

I would further remark that it is important that a ferric solution should be employed which will not dissolve or corrode the plate intended to be coated; for if it be attempted to use such a solution, though the iron will be precipitated, it will not only be in a non-coherent state, but the engraved surface itself will be liable to be attacked and injured. It may also be remarked that the coating of iron admits of being removed from a printing surface of copper without injury to the original plate; hence the original plate may, after being coated and used for some time, have the worn coating removed, and then be re-covered with an iron coating as often as may be required; and if care is taken to remove the coating of iron before it has been entirely worn away, the engraved copper or other plate may be made to print a vast number of impressions, and yet remain in the original state it was in when it left the hands of the engraver, or was otherwise first produced; the only limit appears to be in the gradual change which takes place in the body of the printing surface by the compression to which it is subjected in the process of printing. Heretofore, in respect to plates engraved in intaglio, if of steel, they each yield on the average about 3000 impressions without retouching; if of copper, they each yield on an average not more than 800 without retouching; whilst electro casts of copper obtained from the originals will not on an average each yield even 200 impressions without retouching; in fact such printing surfaces are so easily worn, that after the first 100 or 150 impressions

there is a considerable deterioration in the quality of the work produced. Therefore, for the supply of the number of impressions often required by art associations and others, it has been found necessary to multiply the electro casts very considerably. In such cases the invention is applicable with considerable advantage; for I find that an electro plate 40 × 22 inches covered or coated with iron has yielded 2000 impressions without its being necessary to remove and renew the iron coating, there being no perceptible difference between the first and last impression, the work on the plate appearing not to have suffered in the slightest degree. Hence in future, by the application of the invention, it will only be necessary to multiply electro casts to such an extent as may be necessary to ensure the production of prints or impressions with the requisite speed on paper, calico, or other fabrics. At the same time an original engraving on copper would become, when treated according to the invention, more lasting than if engraved on steel. Although original surfaces engraved in relief, and also electro and other casts taken from them, yield a considerably greater number of impressions than those I have mentioned as obtained from plates engraved in intaglio, to which the invention has not been applied, nevertheless the invention is applicable with great advantage to such relief-printing surfaces, whether of copper or other soft metal; for if they be coated with iron according to the invention, they will yield almost an indefinite number of impressions, provided the iron surface be renewed as often as may be necessary, and the printing surfaces be again re-coated.

In carrying out the invention, I prefer to use that modification of Grove's battery known as Bunsen's; and I do so because it is desirable to have what is called an intensity arrangement. The trough I use for containing the solution of iron in which the engraved printing surface is to be immersed in order to be coated, is lined with gutta-percha, and it is 45 inches long, 22 inches wide, and 32 inches deep. In proceeding to prepare for work, the trough, whether of the size above mentioned or otherwise, is filled with water in combination with hydrochlorate of ammonia (sal ammoniac), in the proportion of 1000 lbs. by weight of water to 100 lbs. of hydrochlorate of ammonia. A plate of sheet iron, nearly as long and as deep as the trough, is attached to the positive pole of the battery and immersed in the solution. Another plate of sheet iron, about half the size of the other, is attached to the negative pole of the battery, and immersed in the solution; and when the solution has arrived at the proper condition, which will require several days, the plate of iron attached to the negative pole is removed, and the printing surface to be coated is attached to such pole, and then immersed in the bath till the required coating of iron is obtained thereto. If, on immersing the copper plate in the solution, it be not immediately coated with a bright coating of iron all over, the bath is not in a proper condition, and the copper plate is to be removed and the iron plate attached and returned into the solution. The time occupied in obtaining a proper coating of iron to a printing surface varies from a variety of causes; but a workman, after some experience and by careful attention, will readily know when to remove the plate from the solution; and it is desirable to state that a copper plate should not be allowed to remain in the bath and attached to the negative pole of the battery after the bright coating of iron begins to show a blackish appearance at the edges. Immediately on taking a copper plate from the bath, great care is to be observed in washing off the solution from all parts; and this I believe may be most conveniently done by causing jets of water forcibly to strike against all parts of the surface. The plate is then dried and washed with spirits of turpentine, when it is ready for being printed from in the ordinary manner.

If an engraved copper plate be prepared by this process, instead of a comparatively limited number of impressions being obtained and the plate wearing out gradually, a very large number can be printed off without any sign of wear in the plate, the iron coating protecting it effectually. The operation of coating can be repeated as many times as required; so that an almost unlimited number of impressions can be obtained from one plate, and that a copper one.

This process will be found extremely valuable for electrotype plates, and also for photo-galvanic plates, since they can be so protected as to acquire the durability of steel—and more so, for a steel plate will require repairing from time to time; these will not, but simply recoating whenever it is found necessary. By these means one electro copper plate has yielded more than 12,000 impressions, and was found quite unimpaired when examined minutely.

It is easy to appreciate the importance of this invention as applied to artistic or line engraving more especially; for a copper plate being once engraved, if submitted to the acierage process, will become a lasting property, not liable to deterioration by printing, and the public may expect to be supplied with the very best impressions at a more moderate charge; whilst to the numerous branches of commercial engraving, for the ceramic manufactures and others, as well as to the vast number of old-engraved copper plates existing in this country,

this process is likely to confer an immense additional value.

I need not say that copper is by no means the only metal to which the process is applicable, for the same principle will be found to answer in the case of other soft metals used for printing purposes; and I shall only add, in conclusion, that although the principle of electrotyping has been applied up to the present date in a variety of ways since it was organized by Thomas Spencer in 1837, this is, I believe, the first time that an attempt has been successfully made to prepare an engraved copper plate with harder metal with the view of increasing its printing capabilities, and I feel happy to have been the first to introduce so valuable a discovery into this, my adopted country.

On the Coating of Engraved Copper Plates with Iron by the Galvanoplastic Process. By Dr. H. Meidinger.

The extremely remarkable application of the electrotype, which cannot fail to come into general use in the preparation of copper plates, and to diminish their cost considerably, has recently been repeated by a Frenchman of the name of Jacquin. Several years ago Professor Böttger showed that iron could be easily separated by the galvanic current from a solution of one part of muriate of ammonia and two parts of sulphate of iron. It then presents the appearance of a silver-white speculum, and adheres quite firmly in thin layers upon well-cleaned metallic surfaces of copper, brass, &c.; but a thicker deposit separates again readily on bending. This perfectly pure iron precipitated by galvanism possesses quite different physical properties from that obtained by the process of smelting, which always contains intermixtures, although often in small quantities, of foreign bodies, especially carbon; that obtained by galvanism is as hard as steel and as brittle as glass. Upon this property depends Jacquin's discovery, which is at the same time the first technical application of iron deposited by galvanism.

Engravings on copper are well known to lose greatly in sharpness and expression after the first few hundred impressions have been worked off (these are consequently more highly prized and command a far better price in the market). This falling-off of the plates is due to the constant friction and the great pressure to which they are exposed, by which the surface of the plate is gradually rubbed away, and the engraving becomes lighter until it may even disappear entirely.

The electrotype has indeed already enabled us to make any number of identical copies of an engraved copper plate; the process is, however, uncertain in unpractised hands, and rather expensive; and, moreover, an electrotype copy of a copper plate will only furnish a far smaller quantity of fine impressions than the original plate of hammered copper, as its surface is much more easily worn away. For this reason there is no doubt that Jacquin's method of treating the surface of the original plate itself in so simple, certain, and cheap a way, to enable it to furnish an almost unlimited number of equally good impressions, must be exceedingly welcome to all copper-plate engravers. This process consists, in brief, in coating the plate when completed with a very thin layer of galvanoplastic iron. In consequence of its extraordinary hardness, the latter undoubtedly resists wear much better than the soft copper; and even should it suffer in the course of working, or become detached in spots, there is nothing to prevent the rest of the iron from being removed entirely by means of dilute sulphuric acid without the least injury to the copper plate, which may then be furnished with a new coating in the galvanic bath.

In order that the operation may be successful, some precautions must be observed. As in all cases where a galvanic deposit is to adhere firmly to a metallic ground (as in gilding and plating, coppering zinc and iron, &c.), a perfectly clean surface must be offered to the deposit of iron; the engraved copper plate must not be in the least greasy or oxidized. The grease which may be produced upon it by mere contact with the fingers, is best removed by means of a little solution of caustic alkali; a solution of carbonate of soda may also fulfil the object. To remove oxide, the plate is immersed in dilute sulphuric acid, so that at last it appears perfectly bright. It is then washed with water, and put immediately into the iron bath. Here it is attached to the negative pole by means of a copper wire; and opposite to it, at a uniform distance of half an inch to one inch, is placed a plate of iron of the same size united with the positive pole. By means of a powerful battery (which, however, must never give rise to the formation of bubbles of hydrogen on the copper plate), a perfectly uniform coating of bright iron is obtained in a short time, from five minutes to a quarter of an hour. The prepared plate is then very quickly washed with pure water, and afterwards with a solution of carbonate of soda, dried with a fine cloth, and finally rubbed with a little oil or some other fatty matter, in order to prevent any injurious effects of air and moisture; in fact the plate is now treated

just like an engraved steel plate, which it exactly resembles. The excess of ink is said to rub off the surface of the iron much more readily than off copper, so that the work of the printer is shortened by about half the time; in other words, twice as many impressions may be obtained in the same time. If this prove true, it forms a further and very valuable advantage of the new process.

As regards the composition of the saline bath, the author still considers the method described by Böttger as the best. The preparation of the bath by Jacquin's method, by means of the electrical current itself, by dissolving an iron plate connected with the positive pole in the solution of muriate of ammonia, is tedious, expensive, and inadmissible even upon theoretical grounds. The bath is therefore made with 2 parts of commercial sulphate of iron and 1 part of muriate of ammonia, which are mixed together and treated with water until the whole is dissolved: 2 pounds of sulphate of iron and 1 pound of muriate of ammonia require about 4 litres of water, when the solution amounts to not quite 5 litres. If the solution is to be employed directly, it must be previously boiled with fragments of iron plate (or nails), in order to convert any peroxide of iron that may be contained in the sulphate into protoxide, as the former would injure the deposit of iron. The same end is attained by leaving the solution for several days in contact with metallic iron in closed vessels. It is also necessary after use to preserve the solution in such a way that it may not readily combine with oxygen. The sign of its goodness is its pale green colour; it must on no account possess any yellowish tinge. The formation of yellowish-brown or even black flakes in the solution during the operation cannot be entirely prevented; they are separated by filtration when convenient, but have no unfavourable influence upon the formation of the deposit of iron if the copper plate be moved slowly to and fro in the bath.

The best form of cell for the decomposition is a wooden trough, of the length and depth of the copper plate, and about 2 inches clear in width; it should be coated internally with wax or pitch. If the iron plate which serves as the positive pole, and which dissolves during the operation in the same proportion that the iron is deposited upon the copper plate, and thus keeps the bath in a proper state, be fixed to one wall of the trough, it leaves sufficient space to allow the copper plate to be slightly vibrated. Such an arrangement is to be preferred in this case to the employment of a flat trough, which is advantageously used in the preparation of thick copper plates.

Daniell's battery produces a sufficiently strong current for the decomposition of the solution of iron if the negative excitant (the copper cylinder surrounding the zinc) possesses about the same amount of surface as the engraved copper plate. If the latter be very large, two or three Daniell's elements may be employed.—*Chemical Gazette*, Sept. 15, 1859.

The Estimation of Actinism.
By Harry N. Draper, F.C.S.

It will be within the recollection of some of the readers of this Journal, that in the September of 1857 it contained an article from the pen of Professor Draper of New York, upon the important subject of measuring actinic variations. This article originally appeared in the 'Philosophical Magazine;' but so important were its bearings upon photographic science, that it was reprinted entire in these pages. Since that time, nearly two years have now elapsed; yet no notice has been taken of the paper*, no one seems to have continued the experiments, and a means of simply indicating the hourly and diurnal amount of actinic influence exerted, of contrasting the results from year to year, and, it may be, finally deducing from them the law which governs the force, is still a desideratum. It cannot be denied that the subject is of the very highest importance; why, then, has it been so long neglected? We possess means of measuring all the other forces whose variations influence matter: heat, atmospheric pressure, electricity, have each their *meters*. Already the quantity of ozone, of moisture, and of organic matter in the air have attracted a large share of attention; why are we to know no more of an agent which probably exercises its influence on all of these, than is taught us by its but imperfectly understood chemical effects? It surely cannot be that the known results of actinism are less important than those of heat or electricity—that the power in which, to use Professor Draper's own words, "lies the starting point of all organization both vegetable and animal," and without which "the whole surface of our globe would be a mere desolate waste, presenting no appearance of life," is unworthy of study! The truth, rather, is, that any means of effecting the object in view have been so complicated as to be beyond the reach of any but those skilled in scientific research. It is true that the comparison of strips of argentized paper after exposure to light left nothing to be desired in the way of simplicity; but then, not only were the results themselves fallacious, inasmuch as paper could

* This paper was written before the appearance of that by Dr. John C. Draper in the August number of the Journal.

never be prepared of uniform sensibility, but registration was impossible, as a given effect would be differently interpreted by different observers, no man being able to lend his eyes to another. Much valuable information has been conferred upon photometric science by the labours of Bunsen and Roscoe; and their very interesting researches encourage the belief that there will one day be found a general law which will unite in a triple bond the three great motive powers of organic life—light, heat, and electricity.

In the mean time some method is required by which the total amount of actinism may be *easily* estimated, which in the hands of ordinary observers shall give accurate results; for it is by the extension of such a labour over a large surface, so to speak, that the greatest number of practical and useful facts will be arrived at in the shortest time. If, for example, the reaping of the field of photographic discovery had been limited to the labours of a Schulé or a Rumford, a Bunsen or a Roscoe, we should have had, doubtless, many facts in relation to the influence of light upon organic compounds of silver, but no collodion process. It is with the hope of enlisting others to take up so interesting and important a research that I am induced to lay before the readers of this Journal a method of actinometry which, though certainly not so simple as an observation by the thermometer or barometer, involves no detail which cannot be comprehended or worked out by any one possessing the amount of chemical knowledge necessary to the successful pursuit of photography. To the scientific photographer, indeed, such investigations must be especially interesting, enabling him in some measure to remove the uncertainty which hangs more or less over his labours, and may in time lead to such knowledge as shall, by giving him an insight into cause, enable him to calculate with exactitude upon effect.

Professor Draper discovered that when a solution of peroxalate of iron ($Fe_2 O_3, 3 C_2 O_3$) is exposed to the influence of sunlight, it is decomposed, carbonic acid being evolved and the lemon-coloured protoxalate precipitated—a change which is expressed by the following formula:—

$$Fe_2 O_3 3 C_2 O_3 = 2 Fe O, C_2 O_3 + 2 C O_2.$$

It is obvious that if we use a uniform solution of the peroxalate of iron and expose it for a certain time to sunlight, a quantity of the salt will be decomposed which is proportional to the amount of actinic influence, and that if we can only determine what this quantity is, we have a means of estimating the variations in the quantity of the decomposing agent. For it is as certain that a fixed amount of actinism is necessary for the decomposition of a given weight of the peroxalate, as that an unvarying quantity of sulphuric acid combines with its equivalent of potash.

Professor Draper in his paper rather suggested means of employing the peroxalate to the best advantage, than recommended any one form of photometer. One of the methods which he proposed was based upon the fact that, after exposure to light, the solution is capable of reducing a salt of gold to the metallic state, in which it might be collected and finally weighed; and the others upon an observation of the volume of carbonic acid disengaged over mercury. Now the former of these means would be so troublesome that even an enthusiast would soon tire of daily following out its details, while the latter, not only from the difficulty of making the requisite corrections for pressure and temperature, but from the apparently insurmountable obstacle afforded by the incrustation of the tube by the precipitated protoxalate, is open to great objection.

The plan which I have adopted, and which I have at intervals pursued since the publication of Professor Draper's paper, is as follows:—

I first prepare a standard solution of peroxalate of iron by dissolving in distilled water 189 grains of pure oxalic acid in crystals, and adding thereto as much moist sesquioxide of iron—obtained by precipitating a solution of the persulphate with potash—as is equal to 80 grains of the anhydrous oxide. When the oxide has dissolved, I make up the entire solution with water to 2000 grains. As this solution will keep unchanged in the dark for an indefinite period, it is better to prepare about ten times the above quantity at once—a proceeding which ensures its uniformity. It should be kept in a stoppered bottle, and, of course, perfectly excluded from light.

My photometer is simple almost to crudity. It consists merely of a square glass cistern, three inches high and capable of containing about 600 grains of water. This cistern is rendered opaque by japanning, and is closed at the top by a thin plate of colourless glass, bordered by varnish in such a manner as only to admit of the transmission of light through a surface of an inch square. In the centre of this plate is a small hole for the escape of the evolved carbonic acid; and at one side a tightly-fitting glass tube about one-eighth of a inch internal diameter passes through it. The use of this tube will be presently seen. This little apparatus when in use is placed on a metal stand, and covered with a small glass shade, such as is used for protecting statuettes.

In photometric experiments there are two

main points to which attention must be given. These are the choice of a proper locality, and the settlement of a fixed number of hours for their duration. An open garden, or the roof of a house, are almost the only places where such investigations can be well conducted by private observers; and, provided that there is no danger of the apparatus being disturbed, either will answer the purpose. For the purpose of comparing the results with those arrived at by others, it is necessary that there should be no adjacent objects, which, by intercepting light, may modify them. This precaution, of course, only applies to trees or buildings which are above the horizon; for, as the light is only admitted from above, objects on the same, or even a little above the level of the apparatus, need not be taken into account. To secure the coincidence, however, under similar circumstances as regards light, of observations in the same series, it is imperative that the locality, once decided upon, should remain unchanged.

The time of exposure will of course depend upon the character of the investigation. If we wish to determine the total amount of actinic power exerted from sunrise to sunset, the apparatus must be adjusted in the evening and removed next night; or we may select any period during the day and compare the results of a few hours' exposure; or, again (and this is perhaps the best means of arriving at accurate conclusions), the experiments might be distributed among different observers, to each of whom a single hour would be allotted, and the results be finally collected and tabulated. In this way a mass of facts would be collected, the acquisition of which would be far too laborious to be undertaken by one person.

My method of making the actinic relations of peroxalate of iron subservient to the purposes of photometry is unlike either of those proposed by Professor Draper,—consisting in the determination *by weight* of the carbonic acid evolved. The determination of a gas by weight is always a more accurate proceeding than any method which is based upon the measurement of its volume; but in this case especially any method of volumetric estimation would be inadmissible, not only from the difficulty of making the necessary corrections for pressure and temperature, but from the impossibility of preventing the incrustation of the apparatus by the precipitated proto-salt.

I proceed, then, as follows:—

In the glass cistern is placed 500 grains of the standard solution of peroxalate—a quantity which is convenient to employ, as containing one-fourth of an equivalent (in grains) of the salt. The glass cover with its attached tube being now replaced, the weight of the whole is accurately noted. The apparatus, being covered with its glass shade, is then replaced *in situ* and exposed to light for the length of time fixed upon. If the apparatus after exposure were at once weighed, the loss in weight would not be at at all an accurate indication of the extent to which decomposition had taken place; for a quantity of carbonic acid, varying with the temperature, always remains dissolved in the solution: this must be expelled in order to arrive at a correct result. This is accomplished in the following manner:—

Hydrogen is generated in a Woolfe's bottle; a solid mass of zinc being employed in order to ensure its gradual and continued evolution; and the exit-tube of the bottle being connected with the tube passing into the photometer, a gentle stream of the gas is passed into the solution for half an hour. When this operation is completed the apparatus is disconnected, the photometer weighed, and the result deducted from its weight before exposure. The loss in weight gives the quantity of carbonic acid produced by the decomposition of the solution, and an indication of the amount of actinic influence exerted during the time which the solution was exposed. There is one other correction which it is necessary to make in order to ensure the accuracy of the observations. It is for evaporation, which takes place, during the exposure of the apparatus, to a very considerable extent. If, however, a similar cistern be exposed which contains only water, side by side with the photometer, its loss in weight will indicate the evaporation of the fluid in the other,—a loss which must be deducted from the apparent loss of carbonic acid. As it is well to reduce the evaporation to a mininum and also to preserve the temperature of the solution as uniform as possible, the outside of the cistern should be varnished in *white*. This precaution may also be taken with reference to the stand upon which the apparatus rests.

I have found it convenient, for the purpose of tabulating the results, to draw up a form in which each weighing is distinctly stated; by doing this, and at the same time noting the daily temperature, in a short time a table of the evaporation at different temperatures may be drawn up which shall enable us to dispense with the constant mechanical application of this correction. It is not impossible, also, that in the same manner we may be able to judge by the temperature of the quantity of carbonic acid remaining dissolved. In any case, however, the registration of the temperature is most important, as affecting, perhaps, the action of light itself.

In registering the results, I have adopted the plan of reducing the loss of weight in grains

to tenths of a grain; and in this manner a scale is formed whose zero will be absolute actinic darkness, and whose highest point remains to be ascertained by an exposure of the apparatus during the interval between a tropical sunrise and sunset.

In a series of experiments conducted during the May of this year, I found that the least amount of actinic effect exerted between the hours of 10 A.M. and 5 P.M. was represented by a loss of carbonic acid equal to 13·7 grains or 137°, and the greatest amount by 23 grains =230°.

In conclusion, I shall be happy to give any information in my power to any of the readers of this Journal who may be disposed to continue these experiments.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

Report of the Lens Committee.

To the Members of the Photographic Society of Scotland.

Ladies and Gentlemen,—We, your Committee recently appointed for testing the various forms of view lenses, beg to submit our Report. It having been suggested to us that, for the sake of one or two of our junior members, we should describe the peculiarities of construction of each lens in as simple and popular a manner as possible, we will, with pleasure, endeavour to do so. That class of lens known as the ordinary view lens, consists of an achromatic meniscus lens placed in one end of a short tube, the length of which is usually about the same as the diameter of the lens. A series of stops, or contracted apertures, is placed at the open end of the tube; the whole arrangement when in the camera being thus:—the end containing the lens is next the ground glass; the lens itself being so mounted as to have its convex side also next the ground glass. In this position, if an attempt be made to focus with the full aperture of the lens, the stops being entirely removed, a hazy, indistinct picture will be the result,—the presence of the stops being necessary to the attainment of sharpness. If the position of the lens is reversed, sharpness is attained without any stop; but in this case the field is so much curved as to limit the sharpness to a small spot. This arrangement is practically of little use in photography, unless where an instantaneous view of a particular object is desired.

In an ordinary view lens, the smallness of the stop* necessitates a somewhat long exposure. Mr. Grubb recently patented a peculiar kind of meniscus lens, which claimed to give sharp definition with a much larger stop than the old form would admit of. The ordinary achromatic meniscus is composed of a biconvex crown and a biconcave flint, usually cemented together with Canadian balsam or other transparent cement. Grubb's aplanatic lens, while externally of the same shape and appearance, differs in this respect, that the crown glass lens is concavo-convex with positive focus, and the flint glass the same, with negative focus,—the inner surfaces being of the same radii to admit of their being cemented together. It may here be stated that cementing the parts of an achromatic lens together, quickens and intensifies its action by removing the reflection of two of its surfaces. What is chiefly claimed for the Grubb lens is its increased size of aperture, enabling portraits or groups to be taken by it. The general flatness of field and simplicity of the achromatic meniscus would leave nothing to be desired were it not for the property it possesses of causing marginal straight lines to be slightly curved inwards. To remedy this, Prof. Petzval invented a new lens which professed to render marginal lines of absolute straightness. As such a condition cannot (so far as we are at present aware) be fulfilled by a single lens, this of course is a combination of two achromatics, the front one being a meniscus—convex side outward, the back one being also achromatic, but having a negative focus, or being what is popularly known as a 'diminishing glass,' the elements of which are so adjusted that the aberrations consequent on the front lens shall be corrected by it. This lens of Petzval's is now somewhat extensively manufactured under various names, according te the taste or whim of the manufacturer. One calls it the 'Orthoscopic' lens; another, the 'Orthographic' lens; a third, the 'Caloscopic' lens; a fourth, the 'Petzval' lens, and so on. In reality these lenses are all nearly identical, and differ only in any important degree in the modes in which they are mounted.

The only other view lens we are aware of is one invented by Mr. Sutton of Jersey, made public by him in a communication to the London Photographic Society, and printed, with diagrams, in a recent Number of this Journal. It consists of two meniscus lenses of equal foci —one at each end of a tube—convex side out. Halfway between is placed a small concave lens, of a focus equal to one of the others. The name of this lens is "Sutton's triplet;" and in the author's communication above referred to, he assumes that as Petzval's lens is not free from distortion, another possessing this desideratum is imperatively called for.

* By a small stop we mean a small *aperture* in the stop.

This, he says, is only possessed by his triplet lens.

Having at some length made these preliminary remarks, a few words will suffice to lay before you the results of our trials with these lenses. It is deemed expedient not to mention the names of the various *makers* of those tried by us—suffice it to say they are opticians of the highest eminence. The subject selected was a uniform line of buildings (Montague Street) about 200 yards distant from the camera, with a range of wooden paling in the foreground about 50 feet distant. The camera employed was a 12 × 10 for the compound, and a 10 × 8 for the meniscus lenses. The general definition of the resulting pictures is very good indeed—perhaps owing to the care with which we selected our lenses; but in every case, with *one* exception, there was more or less distortion. While the lenses of the meniscus form gave, as was expected, a slight curving *inwards* of the marginal straight lines, those of the Petzval form gave curvature in the *opposite* direction. The stops of all the Petzvals were, with one exception, placed close to the back combination; one, however, had it placed before the *front* lens, and as this one was considered to give very good definition, it may hence be safely inferred that the position of the stop is not of such importance as some deem it. For *general landscape* purposes, either of those forms of lens, viz. the meniscus and Petzval, will answer well enough, if carefully made; but for *architectural* subjects they will not answer so well.

" Sutton's triplet " is the only lens we have been able to procure which gives perfect freedom from distortion.

Should there be any point in the present paper requiring explanation, we shall be happy to do so, either at the next meeting of the Society or through the medium of this Journal.

In the name of the Committee,

J. Traill Taylor.

81 South Bridge, Edinburgh.

Symmetrical Triplet Lens.

To the Editor of the Photographic Journal.

St. Brelade, Jersey,
Sept. 3, 1859.

Sir,—If you think the Members of your Society would like to appoint a committee of your best men to test the various view-lenses, I will send you one of my Symmetrical Triplets to test against the others. It shall be made expressly for this purpose, of any focal length you choose; and I will publish the exact construction of it in your Journal, if it turns out, as I hope it will, the best lens that has yet been produced. It is, in fact, the only lens which cures distortion.

But there is great difficulty in bringing anything out, and convincing the public. I think, when an individual hits upon anything new, and frankly communicates all that he knows about it, a Photographic Society like yours should test the thing, if the principle *appear* sound; and if it should answer the test and turn out well, they should not hesitate to speak out and give the thing a helping hand.

Actual trial is better than all the talk in the world. The Triplet has been tried in Scotland, and found to answer. Will you like to try it in London?

Yours faithfully,
Thomas Sutton.

The Fothergill Dry Process.

To the Editor of the Photographic Journal.

Sir,—It surprises me to observe such frequent complaints of failures of different kinds in the Fothergill dry process. I have now been a photographer for some years, and have had a good deal of experience in most of the various processes, as also in this one; and I must say that, for simplicity and certainty of result, combined with artistic beauty, I have never known its equal. I follow no particular directions in the preparation of my plates; and I think that all the minute ones we see given, as to the exact quantity of water to use in washing, &c., are simply so much humbug.

After the silver bath, I wash till greasiness disappears, *only* by dipping the plate about three or four times in water; and after the albuminizing I wash *well*, say, in four or five changes of water, thoroughly flooding the water over the plate. The best collodions I have met with are Keene's, of Leamington, and one prepared for me by Mr. R. W. Thomas, both of which are very good; but I do not think that success depends so much on the collodion used as some seem to imagine. For the developer and nitrate bath I use the formulæ given in 'Ackland's Hints.' I keep the bath solution in *glass* and carefully excluded from the light. My present bath has been in working order for nine months. I occasionally add a little fused nitrate. I do not find it necessary to keep the developer *constantly* in motion. My practice is to pour it on, and, after it has remained for about half a minute, to pour it off and breathe well over the plate; on again covering it the picture rapidly appears. I pour off the developer when muddy, and wash the plate, and generally finish with a fresh solution, which greatly

brightens up and deepens the tone of the picture.

The only cause of failure I have met with is one which seems also to have troubled some of your correspondents, viz. a reticulated appearance in the sky. This, in my case, I distinctly traced to the adding of ether to thin the collodion. Whether it was the use of the collodion *too soon* after this addition, or the using too large a proportion of ether (for I did it by guess), or that the ether was unsuitable, I know not; but that this addition was *somehow* the cause I am certain.

I have taken landscapes in about thirty seconds, by using the muriate of ammonia in gum solution, as recommended by Mr. Keene; but the results were inferior to the ordinary ones, and I do not recommend it. As it is, the process is sufficiently sensitive for landscape work, and even for portraiture.

If you think these remarks worthy of space in the Journal, they are at your service.

ROBERT W. HALL, F.L.S.

A Linnæan Systematization of the different branches of Photography. By Dr. J. LHOTSKY.

IT will ever be a subject of philosophical and historical inquiry, why it came that heliography, in contradistinction to all other great inventions in arts and sciences, progressed so rapidly,—that while *Nicéphore Niépce* made the first (rude) sun-pictures about the years 1813 or 1817 in London; forty years afterwards this art was practised by thousands of persons in Europe, Africa, India, Australia, &c. It will therefore, we believe, be interesting to combine a systematic framework of the different sciences, arts, and manufactures to which photography has been hitherto applied.

If we begin with the most elementary science, we mean *chemistry*, it may be thus subdivided and classified:—metallurgic chemistry, the melting, reducing, and primary working of metals; pharmaceutical chemistry, the preparation of compounds for medical use; organic chemistry, zoo- and phyto-chemistry; agricultural chemistry; technological chemistry, a stupendous branch now-a-days, including, most nefariously, the adulteration of all substances used by men and cattle. And after all that endless and limitless amount of chemical knowledge comes now *photographic chemistry*, a branch quite *sui generis*, and which could not be comprised within any of the numerous branches above enumerated. Photography, in its apparently narrow limitation, uses every substance for its operations, from gold and platinum to the white of an egg; and what numberless, most complicated and *delicate* substances had it to evoke, as it were, from the very entrails of chemistry, thus confirming the old adage—

Multa fiunt eadem—sed aliter!

If we continue to reflect on the other branches into which photography is to be subdivided, we shall find that it really possesses already a wide and vast extent. And this classification will also convey a great practical utility, as it will convince all persons who take up heliography as a profession and lifescope, that those especial branches of art, science, and technics must be studied *ipso facto*, if interesting, instructive, and valuable *plates* are to be produced.

Although *astronomical photography* is still in its infancy, yet, what it has hitherto produced promises much at a future time, when the telescope, the microscope, and the photographic camera shall have been intimately connected in their operations. We shall then be nearer to *meteorological* photography *, and perhaps to hydrophotography.

We may next enumerate *technical* photography, the making (printing) of photographs on iron (metal), cotton and other textile substances, on porcelain and other fictile substances, on ivory, &c. We may allude here to *reproductive* photography, the copying and reprinting of manuscripts, printed matter, engravings, &c. But we would prefer to constitute the copying of oil paintings as an especial class of photographic art, one, moreover, hardly issued from its swaddling-clothes.

Architectural photography constitutes already an especial branch, to which *statuary* photography may be added, which, in the reproduction of a long row of basso-relievos, as "The Triumphal March of Alexander the Great," by Thorwaldsen, the Elgin Marbles, &c., becomes a matter of great importance.

If we conclude this paper with the mention of *microscopical* photography, it is for placing the endless at the end of the endless, as it were, because here a new world opens, yet only discernible in its faintest outlines.

From all the foregoing, however, the professional photographer may gather a few words of final advice—*Observe*; *practise*; *study*!

On Phosphorescence, Fluorescence, &c. By Prof. FARADAY.

[From the 'Proceedings of the Royal Institution.']

THE agent understood by the word "light" presents phenomena so varied in kind, and is

* Sunrise and sunset, on the high seas in tropical latitudes, afford scenes which the most exuberant imagination could not surpass.—Could the flashes of lightning (very much varied in their shape) be seized by the camera?

excited to sensible action by such different causes, acting apparently by methods differing greatly in their physical nature, that it excites the hopes of the philosopher much in relation to the connexion which exists between all the physical forces, and the expectation that that connexion may be greatly developed by its means. This consideration, with the great advance in the experimental part of the subject which has recently been made by E. Becquerel, were the determining causes of the production of this subject before the members of the Royal Institution on the present occasion.

The well-known effect of light in radiating from a centre, and rendering bodies visible which are not so of themselves, as long as the emission of rays was continual—the general nature of the undulatory view, and the fact that the mathematical theory of these assumed undulations was the same with that of the undulation of sound, and of any undulations occurring in elastic bodies, were referred to as a starting position. Limited to this effect of light, it was observed that the illuminated body was luminous only whilst receiving the rays or undulations.

But superadded occasionally to this effect is one known as *phosphorescence*, which is especially evident when the sun is employed as the source of light. Thus, if a calcined oyster-shell, a piece of white paper, or even the hand, be exposed to the sun's rays, and then instantly placed before the eyes in a perfectly dark room, they are seen to be visible *after* the light has ceased to fall on them. There is a further philosophical difference, which may be thus stated: if a piece of white oyster-shell be placed in the spectrum rays issuing from a prism, the parts will, as to illumination, appear red, or green, or blue, as they come under the red, green, or blue rays; whereas if the phosphorescent effect be observed, *i. e.* that effect remaining after the illuminating rays are gone, the light will either be white, or of a tint not depending upon the colour of the ray producing it, but upon the nature of the substance itself, and the same for all the rays.

The ray which comes to the eye in an ordinary case of visibility may be considered as that which, emanating from the luminous body, has impinged upon the substance seen, and has been deflected into a new course, namely towards the eye; it may be considered as the same ray, both before and after it has met with the visible body. But the light of phosphorescence cannot be so considered, inasmuch as *time* is introduced; for the body is visible for a time sensibly after it has been illuminated, which time in some cases rises up to minutes, and perhaps hours. This condition connects these phosphorescent bodies with those which phosphoresce by heat, as apatite and fluor-spar; for when these are made to glow intensely by a heat far below redness, it is evident that they have acquired a state which has enabled them for a time to become original sources of light, just as the other phosphorescent bodies have by exposure to light acquired a like state. And then again there is this further fact—that, although fluor-spar which has been heated does not phosphoresce a second time when reheated, still it may be restored to its first state by passing the repeated discharge of the electric spark over it, as Pearsall has shown.

Then follow on (in the addition of effect to effect) the phenomena of *fluorescence*, and the fine contributions to our knowledge of this part of light by Stokes. If fluorescent bodies, as uranium glass, or a solution of sulphate of quinine, or decoction of horse-chestnut bark, are exposed to diffuse daylight, they are illuminated, not merely abundantly, but peculiarly, for they appear to have a glow of their own; and this glow does not extend to all parts of the bodies, but is limited to the parts where the rays first enter the substances. Some feeble flames, as that of hydrogen, can produce this glow to a considerable degree. If a deep-blue glass be held between the body and the rays of the sun, or of the electric lamp, it seems even to increase the effect; not that it does so in reality, but that it stops very many of the luminous rays, yet lets the rays producing this effect pass through. By using the solar or electric spectrum, we learn that the most effectual rays are in most cases not the luminous ones, but are in the dark part of the spectrum; and so the fluorescence appears to be a luminous condition of the substance, produced by dark rays which are stopped or consumed in the act of rendering the fluorescent body luminous: so they produce this effect only at the first or entry surface—the passing ray, though the light goes onward, being unable to produce the effect again; and this effect exists only whilst the competent ray is falling on to the body, for it disappears the instant the fluorescent substance is taken out of the light, or the light shut off from it.

When E. Becquerel attacked this subject, he enlarged it in every direction*. First of all, he prepared most powerful phosphori, these being chiefly sulphurets of the alkaline earths, strontia, baryta, lime. By treatment and selection he obtained them so that they would emit a special colour: thus, seven different tubes might contain preparations which, ex-

* Annales de Chimie et de Physique, 1859, tome lv. p. 1.

posed to the sun, or diffused daylight, or the electric light, should yield the seven rays of the spectrum. The light emitted generally possessed a lower degree of refrangibility than the ray causing the phosphorescence; but in some instances he was able to raise the refrangible character of the ray, emitted to that of the exciting ray. By taking a given preparation and raising it to different temperatures, he caused it to give out different-coloured rays by the single action of one common ray,—this variation in power returning to a common degree as the temperatures of the phosphori became the same in all. He showed that *time* was occupied in the elevation of the phosphorescent state by the ray, and also that time was concerned in various degrees during the emission of the phosphorescent ray; that this time, which in many cases was long, might be affected, being shortened by the action of heat, and then the brilliancy of the phosphorescence for the shortened time was increased. He showed the special relation of the different phosphori to the different rays of the spectrum, pointing out where the maximum effect occurred; also that there were the equivalents of dark bands, *i. e.* bands in the spectrum where little or no phosphorescence was produced.

These phosphori were many of them highly fluorescent. Thus, if one of them was exposed to the strong voltaic light and then placed in the dark, it was seen to be brilliantly luminous, gradually sinking in brightness, and ultimately fading away altogether; but if it were held in the rays beyond the violet end of the spectrum (the more luminous rays being shut off) it was again seen to be beautifully luminous, but that state disappeared the instant it was removed from the ray. Now this is fluorescence, and the same body seemed to be both phosphorescent and fluorescent. Considering this matter, and all the circumstances regarding time, Becquerel was led to believe that these two luminous conditions differed essentially only in the *time* during which the state excited by the exposure to light continued; that a body being really phosphorescent, but whose state fell instantly, was fluorescent, giving out its light while the exciting ray continued to fall on it, and during that time only; and that a phosphorescent was only a more sluggish body which continued to shine after the exciting ray was withdrawn. To investigate this point he invented the *phosphoroscope*—an apparatus which may vary in its particular construction, but in which discs or other surfaces, illuminated by the sun or an electric lamp, might, by revolution, be rapidly placed before the eye in a dark chamber, and so be regarded in the shortest possible space of time after their illumination. By such an apparatus Becquerel showed that all the fluorescent bodies were really phosphorescent, but that the emission of light endured only for a very short time.

An extensive series of experimental illustrations upon the foregoing points was made with fine specimens of phosphori, for which the speaker was indebted to M. Becquerel himself. The phosphoroscope employed consisted of a cylinder of wood, one inch in diameter and seven inches long, placed in the angle of a black box with the electric lamp inside, so that three-fourths of the cylinder were external and in the dark chamber where the audience sat, and one-fourth was within the box and in the full power of the voltaic light. By proper mechanical arrangements this cylinder could be revolved, and the part which was at one instant within, rapidly brought to the outside and observed by the audience. As the cylinder could be made to revolve 300 times in a second, and as the twentieth part of a revolution was enough to bring a sufficient portion of the cylinder to the outside, it is evident that a phosphorescent effect which would last only the $\frac{1}{3000}$th or even the $\frac{1}{6000}$th of a second might be made apparent. All escape of light between the moving cylinder and the box was prevented by the use of properly-attached black velvet.

The cylinder was first supplied with a surface of Becquerel's phosphori. The effect here was, that when by rotation the part illuminated was brought outside the box, it was found phosphorescent. If the cylinder continued to rotate, it appeared equally luminous all over; and when the rotation ceased, or the lamp was extinguished, the light gradually sank as the phosphorescence fell. Then a cylinder having a surface of quinine or æsculin was put into the apparatus. Whilst the cylinder was still, it was dark outside; but when revolving with moderate velocity it became luminous outside, ceasing to be so the moment the revolution stopped. Here the fluorescence was evidently shown to occupy time—indeed, the full time of a revolution; and taking advantage of that, the self-shining of the body was separated from its illumination within, and the fluorescence made to assume the character of phosphorescence. Another cylinder was covered with crystals of nitrate of uranium, a hot saturated solution having been applied over it with a fine brush. The result was beautiful. A moderate degree of revolution brought no light out of the box; but with increased motion it began to appear at the edge. As the rapidity became greater, the light spread over the cylinder; but it could not be carried over the whole of its surface. It issued as a band of light where the moving cylinder left the edge of the box.

diminishing in intensity as it went on, and looking like a bright flame wrapping round half the cylinder. When the direction of revolution was reversed, this flame issued from the other side; and when the motion of the cylinder was stopped, all the phenomena of fluorescence or phosphorescence disappeared at once. The wonderfully rapid manner in which the nitrate of uranium received the action of the light within the box, and threw off its phosphorescence outside, was beautifully shown.

The electric light, even when the discharge is in rarefied media, or as a feeble brush, emits a great abundance of those rays which produce the phenomena of fluorescence; but then if these rays have to pass through common glass they are cut off, being absorbed and destroyed even when they are not expended in producing fluorescence or phosphorescence. Arrangements can, however, be made in which the advantageous circumstances can be turned to good account with such bodies as Becquerel's phosphori or uranium glass. If these be enclosed within glass tubes, having platinum wires at the extremities, and which are also exhausted of air and hermetically sealed, then the discharges of a Ruhmkorff coil can be continually sent over the phosphori, and the effects, both fluorescent and phosphorescent, be beautifully shown. The first or immediate light of the body is often of one colour, whilst on the cessation of the discharge the second or deferred light is of another; and many variations of the effects can be produced.

In connexion with rarefied media it may be remarked, that some of the tubes of Geissler and others have been observed to have their rarefied atmospheres phosphorescent, glowing with light for a moment or two after the discharge through them was suspended. Since then, Becquerel has observed that oxygen is rendered phosphorescent, *i. e.* that it presents a persistent effect of light, when electric discharges are passed through it. I have several times had occasion to observe that a flash of lightning, when seen as a linear discharge, left the luminous trace of its form on the clouds, enduring for a sensible time after the lightning was gone. I strictly verified this fact in June 1857, recording it in the 'Philosophical Magazine *,' and referred it to the phosphorescence of the cloud. I have no doubt that that is the true explanation. Other phenomena having relation to fluorescence and phosphorescence, as the difference in the light of oxygen and hydrogen exploded in glass globes, or in the air, were referred to, with the expression of strong hopes that Becquerel's additions to that branch of science would greatly explain and extend them.

* Philosophical Magazine, June 1857, p. 506.

Photographic Copyright.

[From the *Athenæum* for June 25, 1859.]

An important and interesting trial of copyright in the Rolls Court, Dublin, came to a second hearing on Wednesday, last week, in which Mr. Wallis's picture of "The Death of Chatterton" played the principal part. The facts, as stated in the petition and by the counsel, were these:—

The original painting was first exhibited at the Royal Exhibition of Arts in London in the year 1856. It was purchased by Mr. Augustus Leopold Egg from the artist. There was an agreement whereby Mr. Egg sold to Mr. Turner the right to engrave the picture, with liberty to exhibit it for the purpose of obtaining subscribers. The only permitted publication of the engraving of the picture was in the 'National Magazine.' In the month of April the picture was carried over to Dublin to be exhibited. The picture was known as "The Death of Chatterton," and so entitled by Mr. Turner. Now, this title was assumed by Mr. Robinson, a dealer in photographs; and an advertisement published by him stated that he would have "the beautiful stereoscopic figure of the last moments of Chatterton" ready for sale on the following Monday. Mr. Turner, believing that such an advertisement would injure his property, applied to Mr. Robinson to discontinue the sale. Mr. Robinson refused to stop his publication, on the ground that his stereograph was not copied from Mr. Wallis's picture, but was an independent study from the biography of Chatterton. Hence the application to the Rolls Court for an injunction to restrain. At the first hearing, which took place in May, the injunction was granted, Mr. Robinson submitting until an affidavit could be framed. He came before the Court with an affidavit stating that it is imposible to take pictures for stereoscopic slides from a plane surface such as a picture. Last week he also affirmed that in March of the present year he made arrangements for a series of stereoscopic pictures, illustrating the life of Chatterton, such as his Meditations in the Muniment-room of St. Mary's, Redcliffe, Writing his last Letter to Walpole, &c. The series was completed, with the exception of Chatterton in the Muniment-room. Having seen the painting and studied the works which gave an account of the poet, he made arrangements to produce these illustrations. He constructed, in his establishment in Grafton-street, a background scene of London from a painting upon

canvas, by a clever artist, and so disposed a figure as to represent the dead poet. His advertisement intimated that the stereograph of the death of Chatterton was from the "living model." An affidavit was put in by Mr. Wallis, in which he stated that his picture was original, and that he had not copied from any one. An engraving was produced and handed up to the Court, from which it was alleged the artist had derived his idea of the death of Chatterton. It purported to have been engraved by Edward Orme, of No. 14 Old Bond Street, painted by H. Singleton, and dedicated to the Marquess of Lansdowne. The date of publication is given as 1st of May 1794. Beneath the engraving are the words from Cowley—

"Behold him, Muses, see your favourite son
The prey to want ere manhood has begun,
The bosom ye have fill'd with anguish torn,
The mind ye cherish'd drooping and forlorn."

The engraving represents a garret and miserable bed—Chatterton reclines upon the pallet in a dying state; his head lies at the right side of the picture, the shoe is on the right foot, the other shoe is off, a phial lies on the ground, manuscripts are scattered about—a chest containing paper lies open; on a small table, books are seen, and also a candlestick, the extinguisher being on the candle; three pens have been carelessly thrust into an old ink-bottle; upon the wall a caricature or grotesque face has been drawn with chalk or cork. At the door stand a woman and child, the former being the landlady of the house in which Chatterton died. Her face exhibits surprise and terror. It was not contended that Mr. Wallis had copied Singleton's picture, but that Mr. Robinson had. Counsel contended that Mr. Turner's title in the work was incomplete, Mr. Wallis not being at present a party to the suit. After a long argument on each side, the Master of the Rolls said that, whatever the ultimate difficulties of the case might be, there was no question as to what he was bound to do at present. With respect to the alleged failure of Mr. Turner to prove his title, the documents which had been laid before the Court showed that he had a title—that was, if he stated it correctly; and the objection at present was, that the petition most certainly did not state it correctly. It was clear to him that there ought to be an amendment in the petition—that the facts should be accurately stated, and that Mr. Wallis should be made a party to the suit. It was quite plain, from the importance of the question at issue, that the injunction should be continued until the hearing of the cause. Suppose that Mr. Wallis had never sold the picture, but exhibited it at Mr. Cranfield's for the purpose of engraving, would he in that state of facts have a right to sue? He had a very strong opinion (though he admitted the question had never been the subject of decision) that the painter had, by common law, the very same protection which the author of any work enjoyed previous to publication. Surely nothing could be more unjust than to say that if a painter gave the public the privilege—and a very great privilege it was in some cases—of allowing them to see a work of art in his studio, a person who had thus inspected the picture, having a good memory, and being an artist himself, would have a right to endeavour by some contrivance to make a copy of that work—for instance, by getting his apprentice, as was done in the present case, to dress himself up in a peculiar manner, so as to represent the principal figure in the painting, and then taking a photographic representation of the subject composed in imitation of the picture, and representing it in terms by advertisement as a copy of the picture. This had been done in the present case, the photographic pictures sold by the respondent having been advertised in the newspapers as "The Death of Chatterton." He looked upon this as nothing short of a fraud, a deliberate fraud; and he had not the slightest difficulty in holding—on the principle laid down in the case of Prince Albert *v.* Strange, which was the principle of common sense, and in the admirable judgment of Mr. Justice Erle in the case of Jeffrey *v.* Boosey—one of the ablest judgments that had ever been delivered—that it would be the bounden duty of a court of equity to interfere in such a case, quite irrespective of the common-law right of the painter to sue for damages, which right he would have as long as he had not published the picture. The question then arose whether there had been a publication of the picture; because, if there had, then, considering the principle laid down in the case of Jeffrey *v.* Boosey, it would be very questionable what the law might be. He had no hesitation in saying that the exhibition of the painting at the Royal Academy was not such a publication as would deprive the artist of his right. It was a qualified publication—it was a privilege allowed to the public to see works of art. Did any one suppose that if Sir Walter Scott read out one of his productions to a number of his friends, and if one of them had such an accurate memory that he could reproduce every word of it, or if some person was in a corner taking notes in shorthand—did any one suppose that in such a case the reading of the work would amount to a publication, so as to give the person who had taken notes a right at common law to bring out an edition of the work? In analogy to that case, the exhibition of a picture at the

Royal Academy or at Mr. Cranfield's or elsewhere, for the like purpose, would be nothing more than a qualified publication, which would not deprive the painter of his remedy at common law or in equity to prevent a party from the commission of a fraud in attempting to copy the picture. A difficulty, however, existed as to the third point—namely, that there had been a publication in the 'National Magazine.' But for that publication, there would not be any serious doubt in this case. He was not prepared to say, nor did he wish at present to offer an opinion on the matter, what was the effect of that publication in the 'National Magazine.' If the respondent had simply confined himself to copying that engraving, it was questionable whether the petitioner would have any cause of action against him. But he had not confined himself to merely copying the engraving—he had undoubtedly used it in the preparation of the photograph; but he had also adopted the colouring of the picture for the purpose of inducing the public to believe that the photograph was taken from the picture itself. He thought this was a fraud; he did not use the word in an offensive sense, but a fraud in contemplation of a court of equity. He might entertain some doubt as to whether the photographic pictures produced by the respondent would be a serious injury to the owner of this valuable painting; but if this were overlooked the photograph might by a very easy process be enlarged to the size of the original, and thus an unimportant piracy might be followed up by the adoption of another mode of piracy which would be most injurious to the owner of the painting. His Honour concluded by saying that he would continue the injunction.

Old Buildings and Photography.

To the Editor of the Photographic Journal.

10 Pittville Lawn, Cheltenham,
September 12, 1859.

Sir,—Though I do not practise photography, yet, as an admirer of that delightful art and of its utility in representing architectural objects, may I draw the attention of amateurs or professional persons to the present state of several of the abbeys in this kingdom at the present moment, which has furnished subject-matter for letters in the 'Times'? That of Lanercost in Cumberland is suffering, or about to suffer, very materially in a picturesque point of view, from certain alterations and additions made by order of Lord Carlisle in the farm buildings which are close to it. Crowland, the most celebrated of the English abbeys, with an elaborate front ornamented with the statuary of kings and abbots, and with window-tracery well worthy of preservation, is pronounced by the vicar to be in such a state that in no long time its ruin will be completed. Whitby is too well known, if only from the author of 'Marmion,' to require any particular description; but its commanding situation is such as would entitle it to the peculiar attention of the archæologist. Suffice it, however, to say that no other attempt is made to arrest the destruction of this splendid edifice than by "shoring-up" those portions which appear to be in the most dangerous state. If these buildings are doomed to fall from the apathy of those who ought to take an interest in them, may we at least hope that by the aid of photography they may be faithfully preserved to us? I have written this letter, trusting that it may meet the eye of some of your correspondents.

H. Philipps.

Archer Fund.

To the Editor of the Photographic Journal.

Sir,—I cannot but feel some surprise that those gentlemen who are using collodion professionally, and who have not yet subscribed to the Archer Fund, should hesitate for one moment to contribute towards the support of the three orphans of the late Mr. Scott Archer, although they may be deriving considerable incomes by the application of his discovery.

I regret that I have only one name to add to the list since the last month, viz. W. D. Hemphill, M.D., £1. The two following were omitted in the last by mistake:—Messrs. Ogle and Edge, £2 2*s.*; Mr. Thomas Snosswell, £1.

Yours truly,
W. J. Newton.

REVIEW.

Seven Years' Travel in Central America, Northern Mexico, and the far West of the United States. By Julius Froebel. London: Bentley, 1859, pp. 587, roy. 8vo, with numerous illustrations.

We shall take occasion to review, from time to time, works of travel to distant parts of the world, especially such as are sufficiently illustrated, and afford an insight into the *nature-scenery* of the land, being then quite germane to the especial scope of the 'Photographic Journal.' It is the interest of every Scientific or Art Journal to promote the popularity of such works as the above, as we had indeed quite enough of *diaries* and the like, about what "dear Charley" did on a certain day, the transactions at a dinner-party in the Punjaub, &c. Such *may* be pastime, but it is *not* literature.

Mr. Froebel begins his work at once with

something sterling and to the purpose. "In 1850, the project of constructing a ship-canal across the Nicaragua isthmus was generally believed to be near its realization. A corps of engineers had been sent to that country for making the necessary surveys; and a favourable result was expected. Nicaragua appeared to me in the attractive light of a region about to become the theatre of an important movement in civilization; and my interest was excited in a sufficient degree to induce me to visit it." . . . . .

"It is difficult to give an idea of the magic beauty of some of the sunsets I witnessed in the Caribbean Sea on this occasion. One evening the whole western sky was of the deepest vermilion. Golden threads, as if a metallic web were spun over its surface. North and south the burning red, with a transition through all gradations of carmine, purple, violet and indigo, ultimately passed into brown. Here and there, like the unveiled portion of an upper sky, some ethereal region (!) beamed through between the more earthly colour of the lower atmosphere, and appeared in a bluish-green of the softest hue." (p. 4.)

Thus our author arrives at the Isthmus of Panama, and passes through Chagres on to Grenada. He observes every thing worthy of being seen, and dilates on it as a man who has made serious and well-directed studies. The following description of a *ravine* near Grenada is interesting:—

"There are only a few places where this deep ravine can be crossed; and some of these crossings can only be effected by passing through side branches of the main fissure, so narrow that there is scarcely room for one man, the walls being quite perpendicular. The whole, for a certain distance upwards, forms a cool alley, under the shade of shrubs and trees that grow above the rock, uniting their branches over it. The walls, always perpendicular, are ornamented by a variety of delicate ferns and Lycopodia, and by the rich violet flowers of a Gesneria growing on them. They are full of holes and cavities. Some of the latter, even large enough for men to enter, seem to be the abode of several kinds of quadrupeds; while the former are occupied by numerous owls, and by the nests of some birds of brilliant plumage." (p. 27.)

Who, that has ever been in the tropics is not reminded by even this simple passage of the stillness and melancholy of such places? while the warmth of the earth and the fragrancy of the vegetation remind us that we are far from home. The following is the description of a mountain-trip in the province of Mousquitia:—"The change of scenery on reaching the summit of the ascent had been so complete and so sudden, that it seemed as if a hundred miles had intervened between looking forward and backward. In the latter direction, which was that to the S.S.W., the view followed the valley through which I had ascended. Mountains of considerable elevation appear on both sides, the highest being the Cerro de Juigalpa, which stands to the right, and is marked by its abrupt steepness. When the valley opened into the plain of Acoyapa, the view passed over the lower country, beyond which the lake expanded itself at the foot of an extensive region of mountains and hills. Just before the opening of the valley, the two peaks of Amatepe rose above the waters. Beyond this island the hills of the Isthmus of Rivas were seen; and on the farthest end of the horizon, faintly traced, the volcanos of Costarica were discernible. The Mombacho, a little before, to the right, marked the site of Grenada." (p. 128.)

We have marked this passage especially on account of Mr. Froebel's plate, representing a "View taken from the edge of the Tableland of Upper Mosquitia." It is very creditably executed indeed, the mountain-forms well seized; but what would such sights be, if rendered through the camera of an able artist? Here nought but *combination* will do—because, as the pen without the camera is insufficient, so is, in most cases, the latter without the descriptive *power* of a scientific man*.

The Second Book of our author's work embraces a "Journey from New York by Missoury to the North of Mexico, stay at Chihuahua, &c." We extract an interesting episode, entitled "Prairie Marmots, Owls, and Rattlesnakes:"—"The place where the Buffalo cow was caught and killed was a large burrow of the sociable prairie marmots, which have very incorrectly been called prairie dogs. On a level spot of ground where all vegetation is destroyed, and whose clayey surface is as hard as a barn-floor, rise innumerable heaps of earth, each with an opening at the top similar to the crater of a volcano; and this is the entrance to the dwelling of a marmot family. A certain number of such families dig their holes near each other, and form what is called a prairie-dog village. In many places these villages occur in such numbers (sometimes with a small space between them, at others nearly touching each other), that they spread over hundreds of square

* We may be permitted to allude here to an anecdote of the late lamented Dr. Buckland, the geologist. When Hugh Miller (alas! also dead) read his first Essay on the Red Sandstone before one of the British Association Meetings, the Doctor exclaimed, "I would give my left hand if I could write like that man."

miles (!). These little creatures allow but a scanty vegetation to spring up near them, which often exposes the draught-cattle to a dangerous want of food. The prairie marmot has often been described by travellers. The idea that these gnawing animals share their dwellings with owls and rattlesnakes had appeared fabulous to me, until I saw it with my own eyes. I have frequently seen rattlesnakes basking in the sun before the entrances, and coming out from or going into the holes. The manner in which the snake rewards the hospitality shown to it interested me particularly: it takes upon itself the task of freeing its kind host from a too numerous progeny." (p. 257.)

The next of Mr. Froebel's plates bears the title "View in the Mining District of Santa Eulalia, with the Ruins of the old Mining Town of Magellanes." This is an exceedingly fine and interesting view relative to an old mining district, from which, in 130 years, 43,000,000 marks of silver had been extracted. Mr. Froebel says, "In the afternoon I explored the mountain on the south side of the valley. Here also I observed the contact of limestone with porphyry. The latter had, in places, been extensively decomposed and regenerated (??); in other places its surface was covered with fibrous radiated quartz as with a glace. Near the summit there is a deep ravine, the precipitous sides of which were covered with the gigantic lily-bearing stems of the Yucca—an interesting sight whenever seen. Yuccas, Dasycliniums, Opuntias and Agaves covered the mountain-sides, with many thorny shrubs, Acacias, Köberlinias, *Berberis trifoliata*, &c., growing among them. It was the end of March; and all plants which could subsist without the summer rains were in full spring beauty." (p. 358.)

Thus our author progresses through these thousands of miles of unexplored—almost unknown—country, the description of which he gives with the good sound sense of an university-bred man.

[To be concluded in our next.]

OBITUARY.

Death of Professor Arthur Henfrey, F.R.S.

It is our melancholy duty to record the death of this gentleman, at his residence at Turnham Green, on the morning of the 7th inst.

Professor Henfrey edited the first two volumes of this Journal, and had long been known as an excellent histologist and sound vegetable physiologist. Especially conversant with the botanical literature of the Germans, it has been to his pen that we owe many valuable dissertations upon subjects little attended to in England. The papers in the "Micrographic Dictionary" of himself and his friend Dr. Griffith are justly celebrated for their accuracy as well as skilful condensation. The physiological part of his "Elementary Course of Botany," and the papers on Vegetable Structure now in course of publication in the "Journal of the Royal Agricultural Society," will always be regarded as the productions of one who was not only familiar with the truths of science, but able to render them attractive to those who are little accustomed to think upon such subjects. In private life he was endeared to his friends by the gentleness of his manners and the genuine kindness of his nature; while to his young family his loss is irreparable. Professor Henfrey was a Fellow of the Royal and Linnean Societies, a Member of the Council of the Horticultural Society, Professor of Botany in King's College, London, and Examiner in Natural Science to the Royal Military Academy and the Society of Arts. He died in the 39th year of his age.

Sudden Death of Mr. Andrew Ross the Optician.

Mr. Wakley has held an inquest on the body of Mr. Andrew Ross, aged 61, the well-known optician and astronomical-instrument maker, of Featherstone-buildings, who died at his late residence, 63 Pentonville-road. The deceased was found dead in his bed on Thursday morning; and the witnesses were closely questioned as to his general demeanour, as it had been rumoured that he had been in a desponding state, and might have committed suicide. The medical and other evidence, however, tended to show that there was no ground for such a supposition; and a verdict of natural death was recorded. The deceased is said to have died worth at least £20,000.—*Observer.*

ANSWERS TO CORRESPONDENTS.

If any gentleman, whose name has been accidentally omitted in the List of Subscribers to the Archer Fund, will forward the same to Sir William Newton, or to the Editor of this Journal, the correction shall be made in our next.

W. S.—The calotype process was published in the eleventh Number of the Journal. It was afterwards amplified in 'Notes and Queries.' With ordinary care, a failure can scarcely occur. If the paper is good, nearly as much definition and transparency in your negative may be obtained as if glass was used. It is infinitely more certain and easier of manipulation than any wax-paper process. The only drawback is that the excited paper should be used within twenty-four hours after it has been prepared.

Sir,—In using chloroform and amber varnish for positives, there is a play of iridescent colours which spoils the picture.

1. Will you kindly state the cause of this, and the means of prevention? 2. Is there any other varnish for collodion positives with which this will not occur? 3. Is the Paris "Vernis Soehnée" mentioned by Lake Price (p. 118) good, and free from this?

Your notice will much oblige me. A. B. P.

1. The film of amber is too thin, from an insufficient quantity being contained in the chloroform.

2. We have used varnish made by recent London makers, which answers perfectly well. (See advertisements.)

3. The varnish of Soehnée is a very beautiful varnish; it was in use before the introduction of photography, for the purpose of varnishing leather and ornamental articles. The late Dr. Ure devoted much time to its perfection. Even when perfectly dry, it has a degree of elasticity, and does not crack when applied to book-covers, &c.

The advantage of amber varnish, however, over all others, is its easiness of application out of doors, when heat is not to be obtained to promote drying, as also its hardness. When well prepared, we have often had to pay close attention to which side of the negative the varnish has been applied.

R. W. G. (*Aix-la-Chapelle.*)—The specimens of photography which you have kindly forwarded are very beautiful. The negatives in the hands of some London printers, however, would yield much better results. Your own portrait is one of the very best productions as an untouched genuine photographic portrait which has ever been submitted to us. Copies will be very acceptable at the Exhibition to be held in Pall Mall in January next.

Sir,—I have lately returned from the Continent with upwards of 100 Fothergill plates. Something must have been wrong with my bath, for they show a strong tendency to fog, with a want of sensibility, requiring unusual developing. I do not attribute it to long keeping, though they were prepared about the end of June. The only way I have been able to produce a negative is with iron and acetate of soda, then pyro and citric acid, when picture and fogging commence simultaneously, after which I have to blacken with bichloride of mercury.

My object in writing is to ask if you can suggest a more energetic developer, as even by the means I at present employ, many of the pictures refuse to come out. As I have kept them quite long enough, I would be particularly obliged by an answer in the first Number of the Journal. J. M. S. B.

Similar complaints have reached us from several correspondents who operated during the unusually hot weather. A friend has been very successful in developing his pictures by placing them in a vertical bath of sulphate of iron, 400 grains; water, 20 oz.; Beaufoy's strong acetic acid, 2½ oz. The pictures were thoroughly developed in about two hours, but faint and fogged. After well washing, pyrogallic acid was used, with a few drops of the nitrate of silver bath; and a good printing negative produced.

Probably, if you have some unexposed plates, by experiment you can determine that you have not sufficiently exposed those you have used.

Kilkenny, Sept. 6, 1859.

Sir,—As it is now some time since I wrote to you, enclosing a waxed-paper negative, in the hope that you might be able to give me some idea of the cause of my failure, and not having since received an answer, I again take the liberty of writing to you upon the subject. I have since tried two or three more views, and, as you will perceive by the enclosed negatives, with no better success, though I think I have used every care in the preparation of the paper. Iodizing solution as follows:—Iodide of potassium, 500 grs.; bromide, 90 grs.; rice-water, 36 ozs.; starch precipitated with free iodine: when filtered and quite clear, paper steeped for twenty-four hours. Most of it turned a dirty red colour, which disappeared in the sensitizing bath. All the pictures were three or four hours in the developer, and, after reaching a certain stage, did not appear to get more intense or vigorous; and I had to change the developing bath in consequence of its becoming discoloured.

Having seen so many encomiums upon this process in the Journal, I feel greatly disgusted at my repeated failures, and, never having tried it before, do not know what to impute them to; so that any hints you can give me in your next 'Answers to Correspondents,' I shall feel very greatly obliged for. W. H.

In *our own* hands just similar results have taken place as in our correspondent's; and we therefore cannot from actual experience advise you. Undoubtedly, however, from the patches, your paper has unequally absorbed the solutions. The pictures are also *very much* under-exposed. Try another half-hour. We lately saw a wax-paper exposed an hour and a half, and it was not over-done. In the hands of Mr. Kinnear of Edinburgh, and some few operators, we have, however, witnessed perfect success, with a rare instance of failure. We shall be happy to publish any details of the wax-paper processes from those whose *experience* enables them to give it with certainty.

T. O. Small (*Newcastle*).—Your request is attended to. We shall be pleased to receive your communication as early as convenient, so that there may be no delay from the want of the woodcut illustrating it.

The Gorse, Belbroughton, Aug. 26, 1859.

Sir,—I have lately been working "Long's dry collodion" process, and have met with tolerable success; but about a week since, running short of preservative solution, I manufactured some according to the formula given in Mr. Long's book of instructions. I used the "patent gelatine" sold by J. Bell & Co., 338 Oxford Street, in 6*d*. packets. The citric acid and alcohol (both labelled "pure") were had from a "respectable house" in Birmingham. I prepared about a dozen plates, and, upon developing, found them all more or less stained at the end where the preservative solution was first poured on (the top, when set up to drain). The defect I complain of is a patch very much over-developed, varying from ½ in. to about ¾ in. from the end of the plate (stereoscopic): with the exception of that, the plates have most of them come out very clean and well. My first stock of solution I procured from Bland and Long's; and, as regards the process, I had no failures. The manipulation has been the same with each lot.

If you could put me in the way to remedy the above in your next Journal, I should be much obliged.

W. R. P.

Would a solution of iodide of ammonium in *water* answer for iodizing collodion? I have a solution of the strength of 1 gr. to 5 drops. What I wish to know is, if it would do to add *that* to the alcohol.

1. Your plates have most likely been damaged by leaning them against the substance you dry them on. This you can determine by using more care. Return to Bland's own preparation.—2. Collodion containing even minute quantities of water often gives a reticulated appearance in the negative, injurious for small objects, but not so if used on tolerably large ones. We have often used collodions prepared as you propose, and believe that the small portion of water would be no detriment.

The letter of *D. H.* came to hand too late for a reply in our last Number, for which he was anxious.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 90. OCTOBER 15, 1859.

The first Meeting of the Photographic Society for the ensuing Session will take place on Tuesday, November the 1st, at their Rooms in New Coventry Street. The Secretary will be happy to receive communications from Members of the Society or other gentlemen, to be read at any of the Ordinary Meetings; and he would esteem it a favour if those who are desirous of reading papers would communicate with him, so that the subject proposed to be treated may be made known and circulated amongst photographers, in order that those who may favour the Society with their presence may be informed of the subject, and take part in any discussion which may ensue.

Since our last Number, the Twenty-ninth Annual Meeting of the British Association for the Advancement of Science has taken place at Aberdeen, under the Presidency of our illustrious Patron the Prince Consort. Our readers have been informed by the newspapers and different journals that several papers relating to the heliographic art were read; they have also by this means received a good outline of their contents—so much so that it would be needless for us now to reprint them, unless received from the authors with their authentic corrections and additions. Mr. Claudet, who read some of the most interesting of the communications, which hitherto have been inadequately given to the public, has consented, as soon as his many engagements will allow him, to furnish us with amended copies.

From the following account it will be seen that the public may now possess themselves, at an exceedingly cheap rate, of impressions from all the negatives which have been taken for the Government, as well as those for the Trustees of the British Museum. This is a boon which will be appreciated not only by photographers, but by the public at large.

"To enable the public to derive full advantage from the photographic negatives made officially for the Science and Art Department, from rare and valuable objects in public and other collections, British and foreign, the Committee of Council on Education has caused an office for the sale of photographic impressions from such negatives to be established, at the South Kensington Museum, which will be opened on the 3rd of October. Photographic negatives, made by order of the Trustees of the British Museum, and for the War and other Government Offices, will also be sold. The tariff for unmounted impressions will be as follows:—A single impression, the dimensions of which contain less than 40 square inches, *e. g.* 5×7, or 4×8 inches, 5*d*. Above 40 square inches, 2½*d*. should be added for every 20 square inches or under. A detailed list of the objects photographed is printed, price 2*d*. The Department does not charge itself with the mounting of impressions, as the public is able to do this for itself."

Lord Brougham appreciates Photography. In his speech at the Annual Meeting of the National Association for the Promotion of Social Science, he thus eloquently expresses himself:—

"But let us observe how vast an improvement of social life, and how valuable an addition to our power of executing the law, has been another optical discovery, by which we have made the sun our fellow-workman. It would have been deemed a romance had any one foretold, from observing the effect of light in discolouring certain substances, such a consummation as obtaining the most accurate portraits in a second—portraits the minute accuracy of which hours and days of the painter's labour could not approach,—and the con-

sequent power, not only of preserving the features of those most revered and beloved, but of preventing the escape of criminals, the commission of numberless frauds, and the defeat of the injured in seeking the recovery of their rights. Nor let us forget the less important benefit of improving both our manufactures and the public taste by multiplying perfect copies of all the great pictures in the world, so that for a few pence may be obtained the exact duplicates of Raphael's Cartoons and every other renowned masterpiece,—an application of the art which we owe to the liberal and discerning patronage of the Prince Consort. My illustrious friend and colleague of the Institute, Arago, was so impressed with the vast importance of photography in all its relations, that the last years of his life were chiefly occupied with whatever belonged to this subject."

Long may the illustrious nobleman be amongst us, and meet with the enthusiastic reception which he received at Bradford!

The Photographic Society of Scotland purpose to open their Fourth Annual Exhibition in Edinburgh on the 16th of December next. Two medals are to be awarded for the best two photographs exhibited. Mr. Kinnear, the Honorary Secretary, will furnish intending Exhibitors all the required information connected with the Exhibition.

It is now twenty years since the image formed by a lens in a dark chamber was first permanently fixed on a silvered tablet; the progress of the Heliographic art since the year 1839 has been almost as wonderful as the discovery itself was regarded at that time. Improvement has followed improvement so fast, the progress of discovery has been so astonishingly rapid, that it has required the undivided attention of its votaries to enable them to keep pace with its giant strides. Men of all grades of society have contributed to its success; the results of the experiments of scientific men have been applied by the illiterate and the learned; the camera has been a welcome visitor both in the palace and in the cottage; the practice of photography has been the source of amusement and instruction to the dwellers in both, and the means of existence to thousands. A camera is part of every expedition; it has been perched on icebergs in the Arctic regions and used on the banks of the Zambesi by the Livingstone explorers; and, not content with delineating the wonders of the earth, its uses have been extended to the stars with success: witness, for instance, the results obtained by Mr. Warren Delarue, as described by him at the late meeting of the British Association at Aberdeen.

There has been one disadvantage in the ease and certainty with which sun-pictures are made. Success with ordinary care is so sure, that photographers think of little else than the production of sharp, clean pictures, which requires no knowledge of Art; consequently Art is too frequently neglected. In a former Number we advocated the cause of Art in photography; we return to it again in order to impress still more strongly on our readers the necessity of greater attention to this important matter. We have made great progress in our science since Daguerre and Talbot made their first impressions; and have been of immense value, but there is yet more to be expected from photographers. We do not mean that artistic photographs have never been produced; but there is so much chaff to the few grains of wheat, such an "intolerable deal of sack" to but "one halfpennyworth of bread," that we think nothing has been done in comparison with the vast scope of a science that at first was expected would be used almost exclusively by artists. We hope artists will take up our science much more extensively than they have hitherto done, and that visitors to our next exhibition will be charmed more with the deep thought and earnest poetry of the works exhibited than with the precision and science displayed in the photographs,—not, we are sure, that careful manipulation will be neglected, but that it will be made subservient to photography's legitimate vocation—art.

THE LATE MR. ANDREW ROSS.

The first announcement that reached us of the decease of the above lamented devotee of science was the paragraph which we quoted in the last Number of this Journal; and that intimation was only received at the moment of our going to press; it is almost needless to say we had then no time to do more than quote the article in its integrity as we found it.

As our readers will very naturally feel it is due to the memory of so distinguished a Member of this Society that we should record some of his persevering trials in the intricate labyrinths of so abstruse and difficult a science as that in which the late Mr. Ross excelled, perhaps above every other man, and as the example is calculated to spur others to the same honourably persevering exertion through the weary path leading to fame and worldly wealth, we now attempt to fulfil the duty which has regretfully devolved upon us, of publishing such a memoir as our space will admit.

Mr. Ross, of Scotch parentage, was born in London in 1798. He was educated in the Blue-Coat School, and at the age of fourteen was

articled to a mathematical-instrument maker, to whom he served his time. After the service of his articles, he obtained the experience of a three years' servitude in a mechanical engineer's establishment; he then went into Mr. Gilbert's manufactory of levels, theodolites, and astronomical instruments of the first quality of that date, where he had the honour of constructing and dividing the astronomical circle which is now placed at the Cape of Good Hope, and which so far satisfied his employer that he made Mr. Ross sole conducting manager of the manufactory. We have used the word *honour* as the very word which he, with the characteristic modesty of his genius, used when alluding to the circumstance.

At the time the subject of our memoir was with Mr. Gilbert, the manufactory was visited by Professor Barlow, the inventor of the fluid object-glass for astronomical telescopes, for the purpose of having that instrument made; and finding Mr. Ross a man of exceedingly great talent, the Professor employed him to work that subject out; and this may fairly be said to have been *the commencement of his optical career*.

Ultimately he left Mr. Gilbert, and commenced business on his own account, soon after which, bringing his powerful genius to bear upon the means and appliances of his business in that day, he perceived the absolute necessity of a more perfect means of dividing circles; and the accomplishment of that object he made his task. Ever of an ardent mind, practically he made *Excelsior* his motto; he never undertook anything without the deliberate determination of attaining perfection as far as it is possible for a human being to attain that quality; and the result of his laborious task was soon fully manifested to the world, as may be seen by turning to the article numbered 13 in the forty-eighth volume of the 'Transactions' of the Society of Arts, which extends over thirty pages, and was read by him to the Society when he was just over thirty years of age. For that he received the Gold Isis Medal and fifty guineas: it was "*for his improved method of Dividing Astronomical and Mathematical Instruments, and for his* CIRCULAR DIVIDING ENGINE."

About this time he wrote the article "*Microscope*," which is inserted in the 'Penny Cyclopædia.'

Restlessly energetic, he has left another instance of the activity of his mind recorded in vol. l. page 26 *et seq.* of the 'Transactions' of the Society of Arts, by which we find he read a paper to the Society upon "*his method of preparing Polishing-powder for the use of Opticians, &c.*" Attached to the paper are certificates of the excellence of the powder, from the great authorities of that day. For this paper the thanks of the Society of Arts were voted to Mr. Ross.

Commencing at page 99 of part 2 of vol. li. of the 'Transactions,' &c., it will be found that he obtained another Gold Isis Medal of the Society of Arts, for his improvements in achromatic objectives of microscopes.

In pages 284 and 333 of vol. lii. of the same work will be found two long papers which he read to the Society upon the "*Practical Illustrations of the Achromatic Telescope.*" These papers were read by him on the 8th November and 13th December, 1836; and for them he received the thanks of the Society of Arts.

In the article commencing at page 74 of the second part of vol. liii. of the 'Transactions,' &c., it will be found that he received a large Silver Medal for his invention called the Spherometer, which was another of the instruments given by him to the optical world, and was invented by him to obviate the difficulties of calculating and determining the curvatures of lenses and the contents or diameter of a sphere by measuring only such portion of a sphere as is presented by a lens. By this instrument he was enabled to determine with accuracy the radii of curvature of the grinding tools employed in the manufacture of the object-glass of the astronomical telescope, in which, like all the rest, he excelled in perfection.

In vol. lv. pp. 118–123, of the same 'Transactions' is another paper read by Mr. Ross, "*On the Hygro-Barometer*," for which he received the thanks of the Society.

By the Great Exhibition, 1851, Jury Reports, we find that he was, in company with Sir David Brewster and others, an Associate Juror of "Class 24, Glass," for which he received the Jury-Service Medal.

We also find that the talented deceased was an Exhibitor in Class X., Philosophical Instruments, &c., and that he received a Council Medal "*for great improvements in Microscopes; and for the solidity of structure, good mechanism, and distribution of strength, great size, &c., of his large Equatorial.*" The equatorial telescope alluded to was one of the glories of the Exhibition, and will long be remembered by its visitors.

Only three months prior to the decease of Mr. Ross, he attended a meeting as one of a Committee of the Society of Arts, to examine into the subject of glass-turning.

Mr. Ross's papers, published in the 'Transactions of the Society of Arts,' contain diagrams, some of which are coloured for perspicuity, and mathematical calculations of such a character and so extensive as to have caused the remark that they were sufficient for the labours of any one life.

After a long and arduous struggle between father and son, it was a concession to his only son Thomas, who also has been a member of this Society from its formation, and who was then associated with him in business, that he consented to the annexation to their business of the requisites of Photography. The father's sanction once obtained, the son immediately put all the vast appliances and resources of their establishment in operation to aid the advancement of our delightfully fascinating, beautiful, and useful art. It is a fact worthy of record, that, up to the time to which we have just alluded, all the photographic lenses had their parts, which are now known as anterior and posterior, mounted close together; and it occurring to the son that additional flatness of field would be obtained by the separation of the lenses, the idea was discussed, and soon worked out in various forms, the result being the first separated photographic lens made in England, and which was the progenitor of all our present separated lenses. Mr. Henry Collen, an artist of some eminence, who took up the subject of portraiture through the influence of the Hon. Henry Fox Talbot, obtained from Messrs. Ross one of the earliest combinations in which the lenses were separated; very shortly after which, Voigtlander introduced into this country separated photographic lenses constructed upon principles laid down by the eminent mathematician Professor Petzval, which were a decided improvement upon all that had been then hitherto done. So closely were Ross's lenses followed by Petzval's, or, as they were more commonly called, Voigtlander's, that they induced a belief in one of those singular coincidences in the annals of invention, of two of the most eminent men discovering the same formulæ at the same time in different parts of the world. Professor Petzval's mathematical calculations have been the bases upon which all the best lenses have been since manufactured; but how those bases have been successfully wrought upon in all their details, or how they have been altered, modified, and possibly corrected or otherwise by the practical working optician, we will not now discuss; though we may remark that Mr. Ross was both a mathematician and a working optician, and that his lenses have always been held in the highest estimation in this country,—in illustration of which fact it may be mentioned that the reporter of this Society was present at the sale of the stock of the late Mr. Howlett, subsequently to that gentleman's decease, upon which occasion there were, among the rest, three large portrait-lenses of the same size sold: one by Ross, after a keen competition, realized £18, and was bought by a gentleman residing in the neighbourhood of Dorset Square, whose name, for obvious reasons, we do not mention now; one by Voigtlander was sold for £13; and the third lens, having lotted with it a camera, tripod chest, and other apparatus, was knocked down for £5 10*s.*, giving occasion for certain sly complimentary allusions to the happiness of the fortunate purchaser when he might set to work, inquiries being made as to the class of subject he intended to illustrate at the next Exhibition of our Society. The circumstance of this sale of an eminent (departed) photographer's stock, competed for by eminent photographers and opticians knowing what they were bidding for, is of itself sufficient to support our statement as to the estimation in which Ross's lenses are held; and the sale, it will be recollected, occurred only very recently. Our reporter heard it remarked that the trade-price for which Messrs. Ross sold that very lens was £21 15*s.*, and that the trade-price of Voigtlander's was considerably beyond that sum. Our readers will pardon these £ *s. d.* statements; we have used them because they are illustrations which are comprehensible to all but Skimpoles, and, to a certain small class, the clearest and most decisive of all arguments. So highly are Ross's lenses esteemed, that a well-known dealer in second-hand philosophical instruments asked a gentleman the other day a larger sum for a Ross second-hand whole-plate portrait-lens than Messrs. Ross's trade-price for a new and warranted article of the same description. The lately deceased's son, from his school days, was associated with his father in all his productions, whether for photography, microscopes, telescopes, or other optical instruments; and so complete was the confidence the father possessed in the son's ability to produce each article with all the perfection expected from the name, that he for several years past left the business entirely to the management of the son; and it can but be regarded as a fortunate circumstance that the lamented deceased has optically educated a son to succeed him.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

Answer to Mr. Glaisher's Letter on M. Niépce's Uranium Process.

To the Editor of the Photographic Journal.

SIR, — In his letter in your Journal of August 15th, Mr. Glaisher opens his defence in rather a singular manner, by telling us that he by no means meant to imply what any one has only to look at his report, deliberately got up, as such reports generally are, and published in two different photographic periodicals, to see that he did not only imply, but state as explicitly as words could well be made to state it—namely that M. Niépce de St. Victor was the first to introduce the salts of uranium in photography.

Conscious, however, that this wretched quibble could avail him little, he next pleads ignorance of my previously published experiments, and tells us that "none would regret more the appearance of doing wrong to any man," and that one line from me, stating my claims, or where the evidence in their favour was to be found, would have caused him "*at once* to give me my due." Ignorance of my prior claim, or of where any evidence in my favour was to be seen, is, then, the defence which Mr. Glaisher now means to set up, for himself and those whom he officially represents, for "not at once giving me my due." No better defence in the world, if only consistent with facts, which unfortunately, however, it is not. Grant, for the sake of argument (though rather hard to believe), that among all the Council which undertook to examine, criticize, and prepare a report on M. N. de St. Victor's discoveries and pretended discoveries, not one of them had once seen either the exposure of M. Niépce de St. Victor's plagiarisms in yours and Mr. Shadbolt's Journals, or the specimens of uranium-printing of 1855 (themselves sufficient evidences) which were in your Suffolk Street Exhibition of last spring (and now, I am told, at the Crystal Palace), all this ignorance could justify no more than the *original getting up* of the Report, and its reading at the Society's Meeting, but certainly could not justify their causing it to appear in your Journal and Mr. Shadbolt's without an admission on their part of the wrong which they had, it might be unintentionally, done me in it, *after* their having had (as I have his authority for stating) their attention expressly called to it by Mr. Shadbolt; but what is to be thought of their boasted readiness to give me "at once my due," when they not only allowed the opportunity of another Meeting of their Society to pass over without making any such apology or acknowledgment, but when (to add to the amply sufficient evidences of priority to which Mr. Shadbolt had already called their attention) a printed Exhibition Catalogue containing the evidence of my having shown uranium photographs as far back as 1855 was sent up and placed in their hands, week after week was allowed to pass, and even this failed to elicit from the Council any such expression of regret, or evidence of a desire to give me that due which they would have us believe would "*at once*" follow their being made aware of, or furnished with (even the opportunity of finding out for themselves) the evidence of my priority.

My remonstrance in Mr. Shadbolt's Journal was mild enough; and if that in yours was a little more indignant, my having then waited, when it was written, and in vain, for an acknowledgment of their error, till the last moment, and till I was almost afraid that my protest would be too late for insertion, was enough to account for and, I think, to justify the difference.

After the despatch of my letter to you, I had one from Mr. Shadbolt, containing enclosed one from the Blackheath Society's Secretary, intimating that he returned the Glasgow Photographic Catalogue of 1855, which had been sent as evidence, and stating that, to him *individually*, the evidence appeared quite conclusive, but that the Council, after having had the document in their hands, had not empowered him to make any such admission, or any acknowledgment whatever on their part. The public can now see how well Mr. Glaisher and his associates have merited the character for candour and readiness to do justice, and "*at once*," which they have claimed for themselves. Still, in spite of all this, and in spite of Mr. Wheeler's having expressly stated that he acted only as the mouth-piece of, and had no great influence in the Society, I would, had you sent me down a proof for correction, have softened down my letter a little to give them one more chance of doing justice with a good grace, and trusting to the possible influence of Mr. Shadbolt and the one other apparently candid and fair man among them. It was as well, however, so far* that no proof was sent, as any further forbearance would only have been misunderstood by, and thrown away on men capable of replying to my protest with such a tissue of quibbling and prevarication.

As to the desperate attempt to invoke the ghost of old national jealousies to the rescue, I cannot say I am much in dread of its consequences. Even in old times the love of fair play, and a fair field to all, used to be considered—and (in spite of such distinguished exceptions as Messrs. Glaisher and Co.) I cannot help still believing is in some measure still—a national English

* There was, however, a printer's error, of the word marine for uranium, left uncorrected in consequence.

characteristic; and if so, I can turn the tables on my antagonists, and claim to be a much better Englishman, and so more entitled to the privileges of Englishmen than they are, seeing that, uncomplimentary and shuffling, to use the mildest term, as Mr. Glaisher's letter is, and as you of course know it to be, I should never for one moment think of holding up my hands in astonishment, and howling at you as he and his friends do, or insinuating that your Journal has forfeited all claim to respectability by its insertion. Fortunately for me, it is one advantage of being in the right, that one need not be struck with terror at the idea of the public hearing both sides. C. J. Burnett.

P.S. As the Blackheath Council, while giving Nièpce credit for what was not his own in one direction, seemed inclined to take to themselves some credit in another for discovering M. Nièpce's theoretical errors, I may as well mention that most of them were not only visible to, but pointed out by me from the very first. See a letter in the Liverpool 'Journal,' written by me immediately on the appearance of M. Nièpce's first re-discovery of the uranium process, and published in the Liverpool 'Journal' of about August 1858; in addition to which, I will send you, before your next, a fragment of a letter of June 26, 1858, which you may publish.

P.P.S. I have just opened a number of the *Illustrated London News*, by which I see that M. N. de St. Victor has carried his re-discoveries still further, in the re-discovery of a system of photometry by means of oxalate of uranium, which was published by me in the *Liverpool Photographic Journal* of Dec. 15, 1858. M. N. de St. Victor apparently considers himself to have a vested right in everything which I may discover.

Photographic Impressions on Paper.

To the Editor of the Photographic Journal.

Sir,—I have lately been endeavouring to obtain photographic impressions with some of the formulæ given for that purpose by M. Nièpce de Saint Victor. The results of my trials have not been such as to induce me to persevere in them; but the other day a professional photographer, whose services I had engaged for a time, was printing with me a large number of copies from my waxed-paper negatives, when we met with a circumstance which struck us as remarkable, and as one which seemed to prove to a certain extent the correctness of one of the theories lately propounded by M. Nièpce de Saint Victor.

The weather was warm—the light clear and bright—the exposure of the prints under the negatives consequently short. I had several printing-frames at work; and as soon as one print was sufficiently exposed, I changed the negative for another; each frame had a piece of cardboard placed between the back of the pressure-frame and the back of the sensitive paper. The paper was unalbuminized and of a fine, thin texture, salted with barium and ammonium; *on to the back of this paper was almost immediately transferred the impress of the negative that had been removed from the frame*, while the sensitive side of the paper was receiving an impression from the negative with which it was in contact. I mentioned this to an eminent theoretical photographer—Professor George Wilson,—and afterwards, at his request, I sent him some specimens of the prints, with which he was much struck, and at the same time promised to repeat the operation, which he did, with the same results. *I have seen cases where there have been two or three changes of negatives, one immediately after the other, where there have been distinct traces of each negative on the back of one piece of paper.* The cardboard and sensitive papers were perfectly dry. Taking into consideration these effects, together with the fact that, in developing several waxed-paper negatives in the same bath, I have frequently seen one piece of paper receive an image from another where actual contact of the papers is not, I think, the cause of it, I feel disposed to think that a sensitive surface may receive a larger supply of light than it requires for itself, which it is capable of transferring to any surface, however slightly sensitive it may be to light. I am inclined, too, to suppose that it must be the combined influence of heat with light which have caused these effects, as I never met with them in cold weather.

As I have not met with any case where the results of printing have been similar to those I have mentioned, I am induced to request you to publish this letter in the 'Photographic Journal,' in the hope that I may hear that this is no solitary case, and that it may be satisfactorily accounted for.

An experiment I have been making with sensitive paper for the "waxed-paper process" has struck me as curious, as I have been under the impression that the iodide of silver in the paper could be rendered soluble by immersing it in a rather strong solution of iodide of potassium. I prepared, a few days since, several sheets of paper for the camera, which the weather prevented me from using; I immersed them in a bath of iodide of potassium (12 grains to the ounce), and left them covered up excluded from light for three or four days, after which I hung

them up to dry in my dark room; the following day I exposed pieces of these papers to light, when they gradually changed colour, and in the course of two or three hours became a dark-brown.

I have been making a few notes this spring and summer, the results of a more lengthened acquaintance with "the waxed-paper process," which I shall be happy to send you if you think they are likely to be worth having, or of use to any of your correspondents.

I am rather surprised to see the Report of the Lens Committee, appointed by the Photographic Society of Scotland, in the Journal I have this morning received. I am a member of that Committee, but have not been consulted as to one word of that Report, while I assisted on every occasion when those lenses mentioned by Mr. Taylor were tested. I may possibly, therefore, ask you to allow me at a future time to make some remarks on that Report, when I shall wish to say something with regard to the different merits of pictures I have taken with the old and new forms of lenses.

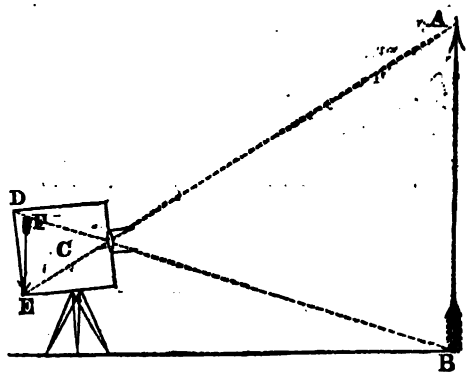
T. Milville Raven.

Waldringfield Rectory, Woodbridge, Suffolk.

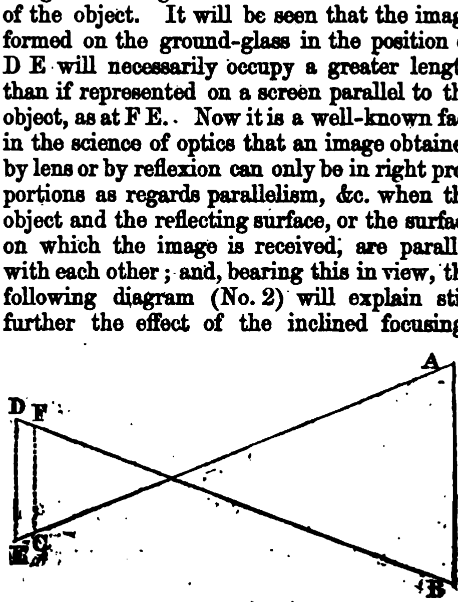
Description of the New Patent Stereoscope.

The object of this invention is to remedy, by a very simple arrangement of the instrument, a defect common, more or less, to nearly all stereoscopic pictures of architectural subjects, viz. a convergence or leaning inwards of lines which should be rendered in the image as they are in the object, perpendicular. This distortion of image is of a different kind to that which is produced by the lens itself, by which vertical and horizontal lines are equally affected, but to so slight a degree as to be scarcely perceptible in a well-constructed objective. The distortion with which we have to deal is caused by the photographer being generally compelled to incline the camera upwards towards the object, in order to include in the field of view the upper portion of architectural monuments; and a little consideration only is necessary to convince ourselves that in many cases the photographer must content himself with more or less of this distortion, or leave his work undone. For instance, a lofty building has to be photographed from a level place or square: in this case, if the camera is carefully levelled in such wise that perpendicular lines in the object are rendered perpendicular on the focusing-screen, then it will follow that the common axis of the camera and lens will intersect the object at a point as much above the level of the ground as the camera's own height, and the resulting picture on the focusing-screen will be seen to contain nearly one half of its area in a most interestingly-detailed street pavement, and but little more than the other half in a representation of the lower part of the edifice. It is true that in some cases the photographer can diminish this evil by planting his camera at a greater distance from the object; but this is not always practicable; and even when it can be done, distortion is not avoided, but simply diminished in amount.

In order to understand fully the cause of this distortion of image, and the *modus operandi* of the Patent Stereoscope, the following diagrams will be usefully examined. Let A B (diagram 1) represent any vertical



object, such as a church-tower, for example, and C the Camera-obscura, so inclined towards the object as to obtain on the ground-glass an image including both the summit and base of the object. It will be seen that the image formed on the ground-glass in the position of D E will necessarily occupy a greater length than if represented on a screen parallel to the object, as at F E. Now it is a well-known fact in the science of optics that an image obtained by lens or by reflexion can only be in right proportions as regards parallelism, &c. when the object and the reflecting surface, or the surface on which the image is received, are parallel with each other; and, bearing this in view, the following diagram (No. 2) will explain still further the effect of the inclined focusing-

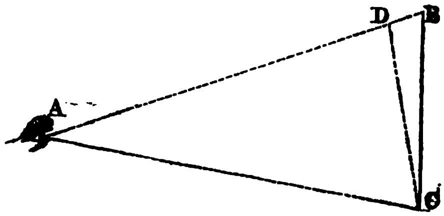


screen in producing convergent lines. In this

diagram we suppose A B to be the width of the tower, equal at the base and summit, and D E, F G, to be the position of the focusing-screen, inclined as in diagram 1, F G being the bottom of the screen, and D E the top of the same; then it will be evident that, whilst the width of the tower at the summit will be rendered as F G on the bottom of the ground-glass screen, its width at the base will be also rendered as D E on the upper portion of the same; and further, that lines produced from E to G and from D to F must necessarily converge.

It will be seen from the foregoing, not only that pictures taken under these circumstances must necessarily have their lines convergent in such a manner as to destroy their beauty, but that, still further, the true proportions of the image are destroyed.

The principle of the Patent Stereoscope consists in presenting such images in a position inclined to the axis of the observer's eye by means of an adjusting bottom regulated at will, and may be illustrated by diagram No. 3, in which let A be the eye, supposed to be



examining a distorted image in a stereoscope. Now, so long as the picture is examined in a position at right angles to the optic axis, its false proportions and convergent lines are painfully perceptible; but on adjusting the bottom in such wise that the image is inclined as at D C, the length of the image will be reduced to its just proportions, and on the same principle the convergent lines are rendered parallel, and all appearance of distortion is corrected.

With an instrument thus arranged, it is evident that the photographer may work with his camera in an inclined position without in future being trammelled with the fear of distorted images and false proportions, since his results may be thus rectified of their defects; and it is hoped that the modification will be appreciated in this sense as well as in permitting the amateur to examine with ease and pleasure such stereographs as he may possess which may come under the category of distortions.

Pictures for this instrument should be cut, before mounting, with their sides parallel to the lines formed in the pictures themselves, and should not be mounted on cards with fillets or embossed borders.

The Patent includes the application of the above principles to the stereoscope in whatever manner the print may be presented to the eye in an inclined position.

Description of a new Photographic Lens, which gives Images entirely free from Distortion. By Thomas Sutton, B.A.

[Read before the British Association at Aberdeen, Sept. 1859.]

Up to the present time no lens which has been used by photographers for the purpose of copying architectural subjects has been capable of rendering correctly the image of a straight line in the margin of the picture. When the common form of the photographic view-lens is used, which consists of an achromatic meniscus placed with its concave side towards the object and with a stop at some distance in front, the marginal lines of the picture, which should be straight, are rendered concave towards the centre of the picture; and when the Petzval view-lens is used, which consists of an achromatic meniscus placed with its convex side to the view, and a much smaller achromatic concave lens placed at a certain distance behind it, and having a stop in contact with it, the marginal lines of the picture, which should be straight, are rendered convex towards the centre of the picture. In fact, no photograph of an architectural subject taken with the lenses in common use will bear the test of a straight edge applied to the marginal lines, which are always curved either inwards or outwards.

In the present paper I will describe a combination which I have invented, by which the above effects of distortion are totally obviated, and which gives an image that is mathematically perfect. I may add that this lens was recently tested by a Committee of the Photographic Society of Scotland against the best forms of the common lenses made by the most celebrated makers, Voigtlander, Ross, Goddard, &c.; and it was pronounced to be the only lens which gave an undistorted image, at the same time that it satisfied all the conditions of a good lens.

The conditions for obtaining an image free from distortion are these:—

1st. The axis of every pencil must emerge from the combination in a direction parallel to that of incidence.

2nd. The axis of every pencil must pass through a certain fixed point.

3rd. The image of every luminous point of the object must be formed at the point where the axis of the pencil meets the focusing-screen.

These conditions are rigorously fulfilled by the lens which I have invented and will now describe.

The combination is a symmetrical triplet, consisting of two equal achromatic plano-convex lenses (one at each end of a tube, placed with its convex side outwards), and a small double-concave lens, of equal radii, placed exactly midway between them. In contact with the double-concave lens, a small stop is placed.

It is evident that, in this combination, a small oblique pencil is incident excentrically upon the front convex lens; that its axis, after suffering deviation, passes centrically through the concave lens without suffering further deviation; and that it is then incident excentrically upon the posterior convex lens, from which it emerges in a direction parallel to that of incidence.

The above is true of every oblique pencil; and their axes all pass through a common point, which is the centre of the symmetrical combination, and which point I will call C.

The 1st and 2nd conditions, therefore, are fulfilled.

The proof that the 3rd condition is also fulfilled is as follows:—

The focus of an oblique pencil is in every optical instrument a disc of light, and not an exact point. The size of this disc is reduced by using a small stop. When it is *sufficiently* reduced by using a *sufficiently* small stop, the focus upon the screen is said to be good. In that state the ray which passes through C (and which I have called the axis of the pencil) is one of the rays which compose the small disc or good focus, because C is at the centre of the stop. The focus is therefore at the point where the axis of the pencil meets the focusing-screen; and therefore the 3rd condition is fulfilled.

It is necessary, in every kind of photographic view-lens, to use a small stop, because the objects of a view are at different distances from the lens, and good focus cannot be obtained in any other way. The use of a small stop is therefore not confined to my Triplet; and when the image is rendered sharp and distinct by the use of a small stop, it is also totally free from DISTORTION.

By a fortunate circumstance, the Triplet gives an image which is equally illuminated in every part, because the area or base of the oblique excentrical pencil upon the front lens is greater than that of the direct central pencil, and in this way the loss of light from obliquity is counteracted.

Spherical aberration in the direct central pencil is totally corrected, because the negative aberration of the concave lens counteracts the positive aberration of the convex lenses. There is consequently brilliant definition in the centre. At the same time the marginal definition is as good, and the field as flat, as that of any lens now in use.

In order to get good marginal definition and the proper flatness of field, the distance between the convex lenses should be about one-sixth of their focal length, and the focus of the concave lens should bear to that of the convex lenses the ratio of about 13 : 8.

Waxed Paper.

To the Editor of the Photographic Journal.

Southfields, Wandsworth,
Sept. 22nd, 1859.

SIR,—Seeing in the last Journal a wish for some practical information about waxed paper, I am induced to forward the particulars of a process which, in the hands of a friend of mine, was very successful, and which I have myself tried this year with good results; it is mainly that published by Mr. How several years ago.

The paper used is Canson's negative; and after waxing, it is iodized with the following solution:—

	grs.
Iodide of potassium	360
Bromide ,, ...	60
Cyanide ,, ...	25
Fluoride ,, ...	25
Chloride of sodium	10

dissolved in serum of milk, 33 oz., to which, after filtering, add iodine about 8 grs., dissolved in $2\frac{1}{2}$ oz. of alcohol. The papers should be soaked in this solution ten or twelve hours, as may be convenient, a few hours more or less appearing to make no difference. The solution must be filtered each time of using, and fresh iodine added, so that the papers may be brown after being iodized. I usually add tincture of iodine by guess.

To excite the papers, use, say 8 oz. of nitrate of silver 30 grs., acetic acid 30 minims, water 1 oz. I use this solution over and over again, always filtering before use, and after sensitizing a few sheets, adding $\frac{1}{2}$ oz. of fresh aceto-nitrate to each $13\frac{1}{2} \times 11\frac{1}{2}$ paper; they should be immersed for ten minutes, washed in two quantities of water, and blotted quite dry, using one sheet to take off the principal moisture and another to finish with, which last will serve for the first blotting of the next paper, and so on.

The exposure with an 18-in.-focus lens, $\frac{3}{4}$-in. aperture, for a well-lighted subject, on a bright day, will be about four or five minutes.

To develope, make a saturated solution of gallic acid in distilled water as follows:—Put into a 40-oz. bottle ½ oz. or more of gallic acid, and fill it up with water so that the stopper displaces some when put in, and leave it a week or two, occasionally shaking up; when any is poured off, fill up with water as before: it will keep for months, if all air be excluded. To 10 oz. of this add one drachm of alcohol, and immerse the papers; when the picture is pretty well out, pour off the gallic acid into the measure, and add 30 grs. of fresh aceto-nit. in the proportion of 3 to 6 minims per ounce; the more rapidly the picture appears, the more silver should be added. I prefer developing each picture in a separate tray.

The weak point of this process is that the skies sometimes lack intensity; but where this is not the case, pictures have been taken by it that are all that could reasonably be desired.

I am surprised that waxed paper is so much neglected in England. I have had considerable experience in almost all the processes on glass; and, in my humble opinion, where the amateur does not wish to make a toil of a pleasure by practising the wet-collodion process out of doors, there is nothing like waxed paper for large views. It gives good definition, is very little liable to the objectionable snowy appearance so common in photographic pictures, and is more certain than any dry process on glass, to say nothing of its superior convenience. The waxing and iodizing operations are tedious and uninteresting, to be sure; but they may be done at any time, even in the winter evenings.

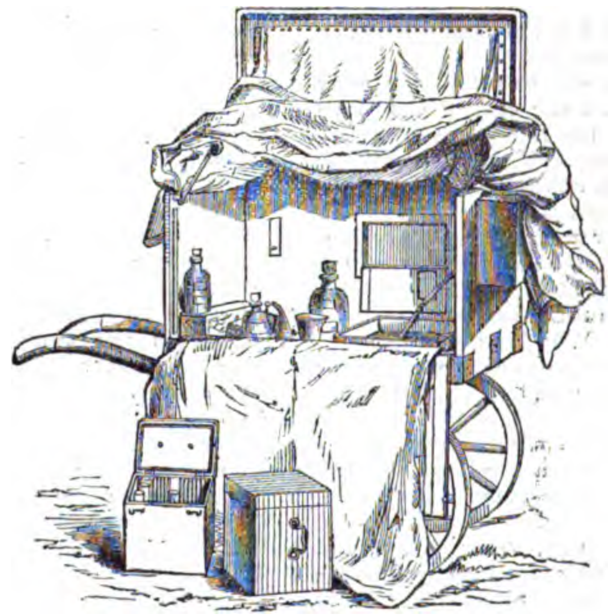
N. C. Turly.

A New Photographic Barrow.

To the Editor of the Photographic Journal.

North End, West Hampstead, Sept. 21, 1859.

Sir,—I send you herewith three views of a Photographic Barrow which I had made some months ago, and which, after a fair trial, I can recommend as being very convenient for field operations. It is, as you will see, simply a box



(2 feet 6 in. × 1 foot 6 in. × 1 foot 6 in. is the size of mine) with the lid made to turn up and one side made to turn down, a covering of black calico being attached to the lid and the top edges of the two ends, which is extended after the fashion of a hood by a bent iron rod which turns out of the box when opened. This hood is made sufficiently long to hang on the ground and completely cover the operator, who is seated on his plate-box. This arrangement gives a clear space for operating of 3 ft. × 3 ft. × 2 ft. 6 in.,—quite room enough to work plates 10 × 12; and these are large enough for all ordinary purposes. The camera, plate, and chemical-boxes all pack inside, also the bath and water-tank, though these last may conveniently remain in their places, except when the barrow is packed for a long journey. One of the chief conveniences of this arrangement is that little or no packing and unpacking, tent-pitching,

&c., is required; you can keep everything *in situ*, and wheel your "dark room" from place to place as required. There is of course a gutta-percha tray for the washings, and a short india-rubber pipe communicating with the "tank" through a hole in the end of the box. Light is admitted by a window in front, closed by inside and outside shutters, and also by squares of yellow calico in each end of the hood.

Ben. R. Mulock.

Heliographia Musæi Britannici.
By Dr. Lotsky.

Whatever importance we may ascribe to the Collection of the Vatican at Rome, the Museo Borbonico at Naples, or the Museums of the Louvre in Paris, yet the above National Collection—the *British Museum*, taken in its grand entirety, surpasses them all in its vast extent and general utility, besides possessing unique specimens, and series of unique specimens: we allude here to the Elgin Marbles, the pride and envy of civilized Europe; to the Salt-Belzoni Egyptian antiquities; to the Nineveh monuments; and last, but not least, to the Budrum Halicarnassus remains, lately brought hither. Whatever of Grecian or Ionian art may yet be discovered, nought will ever equal those sublime remains, which poetic antiquity ranged amongst the *Seven Wonders of the World*. To make the contents of such a collection—*i. e.* the most striking features thereof—accessible to the world at large, is a matter of great importance, but also one of huge extent. Hence, therefore, the popularization (publication) of the contents of the National Collection have been treated in this paper only in so far as it relates to ancient art, or even only to ancient sculpture. As long as the services of most able draughtsmen (*raræ aves* now-a-days), and those of equally clever engravers or lithographers, were to be called into aid (both at a great expense), a *pendant* to Winckelmann's Museo Pio Clementino, or to the many costly works on the Louvre Collection, was not to be anticipated. But now, with the aid of heliography, we can really say, "*nous avons changé tout cela.*" By aid of the great size at which collotypes can be produced, those splendid basso-relievos of the Parthenon can now be rendered in their natural grandeur; and the peculiar hue which can be given to photographs will make such nature-copies even preferable to the earthy and dull-looking casts of plaster of Paris.

Moreover, a *Heliographia Musæi Britannici* will serve a variety of useful art-purposes. As a work by itself, it will be indispensable to any of the many public libraries which now exist or are forming over the whole surface of the globe. It will be acquired by many private individuals, such as purchased Audubon's great work on American Ornithology—probably the largest copper-plate book in existence. The numerous public and free libraries, the mechanics' institutions, the provincial and colonial museums, have all their entrance-halls, their corridor, &c. to be somehow ornamented; and how could this be done more appropriately than by a row of life-like pictures of the marbles of the pediment of the Parthenon, the gigantic sculptures of the old Pharaohs, or the delineation of Assyrian life 3000 years ago? Who will not think, not feel aught at such sights, for him mental life has not yet dawned. Here, therefore, an extensive sale for such photographs is to be anticipated. But an observation which we made even in the sculpture-rooms of the British Museum will show that the spreading of good and valuable specimens after the antique is most desirable for the advancement of Art in general, as well as for British Art. We allude to the many pupils who copy here from the antique, without possessing even the skill to copy after drawings or engravings, where light and shade are tangibly brought before them in lines, which they merely need to transcribe. In Munich, where probably all branches of art are practised to high perfection, the copying after the antique is considered one of the highest degrees of Art-study—so much so, that even a distinction is made between the pupils of the larger and smaller *Antiken Saal*, none being admitted to the latter without having duly gone through the schooling of the former. The more, therefore, good outline specimens of the Antique are placed at the disposal of Art-students, the more Art, in its absolute and industrial branches, will prosper.

As far as, in the first place, *general views* of the sculpture-rooms of the British Museum are concerned, nothing but the largest collodion plates will ever do justice to such splendid sights. It is, in fact, a drawback of cheap (*popular*?) literature, that it accustoms the people to view huge subjects and great characters in a puny, contemptible form. The finest sight which the sculpture-department presented some few years ago, was the Parthenon Saloon in its entirety—a sight most unique, and inspiring respect even in the general sight-seer. Perhaps there was not a sublimer sight in all the European collections than the Hall of the *Elgin Marbles* in the British Museum as it was arranged originally, and had remained so until about two years ago,—those most characteristic processions and groups of the cornice of the Parthenon encircling the walls of the spa-

cious hall, while the body of the room was appropriately filled up by the splendid colossal figures of the pediments of the Athenian building. Other congenial statues and sculpture, placed there, gave the whole an appearance of rich completeness. We were told that there were persons often visiting the room who bared their heads on entering it. All this has been *spoiled* of late,—which is the word used by no less a connoisseur of art than Cardinal Wiseman on seeing the present change. It consists in emptying the Hall of all its statuary, save the basso-relievos of the Parthenon. But basso-relievos alone can never properly adorn the space of any large hall; and thus the *Elgin room* of the British Museum has become a poor concern indeed,—a change the more inexplicable, as want of room is constantly alleged to oppress this establishment. This once grand sight, therefore, which would have afforded one of the noblest subjects for a photographic view, is lost. Still a complete set of the basso-relievos of the Parthenon, life-size and tinted so as to imitate the rich yellow hue of Parian marble sculptured 2000 years ago, will eagerly be sought for by the many continental, provincial, and colonial establishments requiring such an ornamentation.

In considering the sculptures of the British Museum in their great *ensemble*, and the general views which they present, the *Egyptian room* may be mentioned first—represented in a hundred different engravings, not one worthy of the subject. If an immensity of sentiment and nature speak to us in the Parthenon rooms, a certain grandeur—the grandeur of the Pharaonic times of old—overcomes us in these spaces. Champaillon the younger, whom perhaps none ever equalled in the knowledge and appreciation of Egyptian subjects, says that he always felt elated and made bigger, as it were, when, during his travels on the Nile, he passed from the later buildings and monuments of the Roman epoch, again to that of the Pharaohs.

[To be continued.]

Measurement of Actinism.

To the Editor of the Photographic Journal.

October 10, 1859.

SIR,—The letter of Dr. Draper in your last issue calls attention to a subject of vast importance, both in its theoretical and practical bearings, the investigation of which may lead to the elucidation of some of the most mysterious and at present incomprehensible phenomena of photogenic action.

The apparatus employed by Dr. Draper is not, I think, susceptible of any high degree of accuracy, being open to many sources of error in respect of the conditions and *modus operandi* of the experiment, and altogether it is capable of evident improvement.

Meanwhile, however, in order that others who are inclined to work upon the subject may be able to employ, or at any rate to test, the method which I propose, allow me to describe a means of determining the amount of actinic force exerted by the light passing through a given aperture in a given time, which I have found manageable, speedy, and accurate.

I take a square box of pasteboard or wood, white inside, and provided with a light-tight lid, and in one side of it I cut a hole of one, two, or more square inches in area. Within the box and close to the hole I place simply a thin glass flask, such as an ordinary carbonic acid flask, into which fits a cork, provided with a small glass tube drawn out fine at top and passing through a little hole in the lid of the box.

The flask is filled with a measured quantity of solution of peroxalate of iron of known strength, and being thus arranged is exposed for any given space of time to the light. Of course, in a series of observations, uniformity of condition in regard to aspect, elevation, and so forth, must be ensured; and it will be highly important to determine the influence of temperature, and other atmospheric conditions, as well as of the strength of the solutions employed, area of aperture, media through which the light passes, &c.

The amount of the salt of peroxide of iron reduced to the state of protoxide is the measure of the actinic power exerted, and the following method, known as Dr. Penny's, is capable of determining it with such accuracy, that I think, in seasons of moderate activity, it will be easy to estimate its amount for periods of not more than a quarter of an hour.

The operation depends upon the fact that hot solutions of protosalts of iron are peroxidized by dilute solutions of bichromate of potash in presence of hydrochloric acid; and, as many of your readers are perhaps not familiar with the details of the process, it may be useful to describe its application to a specific case.

First, a solution of bichromate of potash of moderate strength is made; and it is not necessary to use this salt in a state of purity, to which it is brought with difficulty. Then 10 grains of piano wire (nearly pure iron) are dissolved in hydrochloric acid, boiled with a fragment of pure zinc to reduce traces of peroxide, the solution diluted to about 2 fl. oz., and the bichromate solution added drop by drop from a burette or graduated tube, till a drop of the

mixture ceases to give a blue precipitate with ferrocyanide of potassium—an indication that all the iron is peroxidized. Suppose fifty-six divisions are required, then fifty-six divisions are sufficient to peroxidize 10 grains of iron in the state of a salt of the protoxide; but it is desirable to dilute this solution with six or seven times its bulk of water, and then to check its strength by another determination. Thus, the solution which I commonly use in my laboratory happens to bear the indication 395=10; but for some purposes I dilute it still further.

Now, by way of further example, I take twenty divisions of the burette of peroxalate solution, boil with excess of hydrochloric acid, reduce by zinc till colourless and until sulphocyanide of potassium gives no red colour (entire reduction to state of *proto*chloride of iron), dilute with hot distilled water, and gently drop in the bichromate solution till the whole is again peroxidized. The quantity required is 147 divisions of the burette. Then, 395 : 10 : : 147 : x, the quanity of iron in twenty divisions of normal solution, =3·72. Also, 250 divisions of my burette = 500 water grains; hence 500 water grains normal solution of peroxalate contain 46·5 grains iron=66·428 grains peroxide of iron.

This solution may be reduced, for use, by dilution with any known bulk of water. I give this determination as an example only, it being unnecessary except in so far as it may be deemed desirable to ascertain whether the dilution of this solution exerts any effect upon the absolute amount of decomposition under actinic influence.

The flask and contents having been exposed, I proceed similarly (except, of course, that the reduction is omitted), and so estimate the quantity of protoxide of iron formed.

The whole operation is extremely simple; and I am persuaded that a person engaged in a *series* of observations would perform the whole in an average time of from five to ten minutes—little more than that required for one weighing, while the method is susceptible of a high degree of accuracy.

I will conclude by an example of an actual observation made on Saturday:—270 divisions of a normal solution were exposed under a 2-inch aperture to direct sunshine (strained, however, through the yellowish medium of a foggy and smoke-laden atmosphere) from 12·30 to 2·30 P.M., boiled with excess of hydrochloric acid, and standard solution of bichromate added to peroxidize. This required 232 divisions, a quantity evidently sufficient to *per*oxidize 5·87 grains of iron existing as *proto*xide. This corresponds to its equivalent of peroxide in the original solution, viz. 8·42 grains; or, the actinic force exerted under the above conditions was capable of reducing 5·87 grains of iron in the form of peroxide to that of protoxide.

I give this as a crude experiment, indicative only of the method which I propose to adopt, but hope, if other engagements permit, to be able shortly to submit the results of some experiments, which may assist, in some slight degree, in the elucidation of this important subject.

A. Winkler Wills.

A New Double Salt—the Iodo-Cyanide of Potassium. By J. Milton Sanders, LL.D.

(Read before the American Photographic Society.)

If a saturated solution of cyanide of potassium in water be made, and immediately there be added to it a quantity of iodine in crystals, the latter quickly *dissolve*, forming a colourless solution — that of the iodo-cyanide of potassium. I obtained this salt while experimenting upon substances with the view of getting rid instantly of the stains of nitrate of silver upon the hands and clothes. This salt fulfils that desideratum exactly. If a small portion of its saturated solution be dropped on the silver stain, whether on the hands or the clothes, it is instantly discharged, even after it has remained there several days. This peculiar property of dissolving silver stains will recommend it to the attention of photographers.

Under polarized light, the crystals of this double salt present a most gorgeous appearance. Put one drop of the solution on a glass slide, and allow it to crystallize spontaneously. If, while the combination is taking place, the slide be placed under the microscope, with the polarizing apparatus adjusted, the crystallization and the following phenomenon may be readily observed. As the fluid becomes sufficiently dense to yield crystals, they begin to start out on all sides, exhibiting a multitude of crosslets and daggers, which soon assume a pennate appearance; until finally they shoot out into beautiful reticulations of prismatic form, each long crystal presenting all the vivid hues of the spectrum. These hues, from their extreme vividness and delicacy, cannot be compared with the almost formless aggregations of the cyanide of potassium, should there be any of that salt in the solution. All the colours of the spectrum are displayed in these iodo-cyanide crystals, but presenting such combinations of hues—so contrasting, yet each one so metallic and brilliant—that the eye never tires of observing them.

These colours are most conspicuous when the selenite is made use of. The two thicknesses which I found to yield the finest colours were

the 3-4 and 1-4 sizes of Ross. With these selenites the crystals exhibited a set of hues, which for gorgeousness of colours, and their peculiar arrangement of contrast, I have never seen surpassed by any crystallization I have ever examined.

As the solution of this double salt decomposes in a few hours after being made, it will be necessary that the crystals should be formed immediately after mixing the ingredients.

In order that there shall be no superabundance of either ingredient, it is necessary that each should be added in the proportion of its equivalent number. I would mention that the partial decomposition of the solution, by which some free iodine is eliminated, does not deteriorate this solution in regard to its wonderful properties of dissolving nitrate-of-silver stains from the hands and clothes; in fact I think that the slight decomposition rather improves that property. As a wash for stained hands and clothes, this salt must necessarily come into general use; and as a polariscope object, the microscopist will not fail to have these double crystals among his cabinet of objects.

I wish that some chemist who has more time on his hands than I, would investigate these double iodine salts. That the one referred to in this paper is the double cyanide of iodine and potassium (Cy^xP, I^xP), I have no doubt. It cannot be, as a friend has suggested, that this salt is a mixture of the cyanide and iodide of potassium. This is proved from the absence of a dual crystallization, and the presence of an isolated one, together with the peculiar specific action it exerts upon polarized light; besides, if there should be a superabundance of the cyanide of potassium present, the peculiar crystallization of that salt is plainly conspicuous, while the delicate and gorgeous ones of the iodo-cyanide can be easily distinguished from them.

In regard to the peculiar brilliant action that these iodo-cyanide crystals exert upon light, I would remark that the double salts in which iodine acts as a component appear to be peculiarly gifted in that way. Herapath's iodo-sulphate of quinine presents another instance of this specific action; and I have no doubt that all other similarly constituted salts of iodine will exert upon polarized light the same peculiar action. Here is an avenue opened for the microscopists, and I hope that they may enter into this charming field of investigation with spirit, for it will yield a fine result. If too small a quantity of the iodine be added to the cyanide solution, it will combine and crystallize out, while the cyanide of potassium will afterwards solidify and deteriorate the crystals. If, however, the proper quantity of iodine be added, this will not occur. —*American Journal of Photography.*

Latest Intelligence of Foreign Science and Art.
From a Correspondent.

Photographs of Cartoons, &c.—The present Art Exhibition of Leipzig has been one of the best for many years past. One of its most prominent features were the photographs made after the Cartoons of Messrs. Sweertz and Geefens, painted for the Exchange of Antwerp. —The Art Academy of Leipzig has had great losses of late. Two of its members, Bendemann and Quandt, have died, and also the two young artists who obtained the two highest prizes, viz. the grant for a sojourn in Italy and the great gold medal. The great work of Prof. Zahn in Berlin—"Pompeji, Herculaneum, and Stabiæ"—has reached its completion, having been begun 37 years ago. It consists of 300 splendid coloured plates, representing the remnants of those destroyed cities, accompanied by a German and French text.

Upper Egypt.—M. Mariette, well known by his great researches in that country, has now assembled 3000 workmen in Upper Egypt for making excavations after antiquities for the Museum of Paris.

Mysterious origin of Galvanoplastic.—In a German work lately published, on the Prussian Post Office, it is stated that Galvanoplastic was used many years before it became scientifically known, in the *Cabinets noirs* of Europe, for the counterfeits of the seals of letters which were opened and had to be re-sealed afterwards.

The climate and the air of the Sahara.—M. Fromentin, whom the French consider the most poetic of painters, gives the following graphic description of the African Sahara:—"There are few Europeans who do not regret what may be called the period of their Sahara life—an existence in the open air, at the chase, in freedom or repose, with the sweet quietude of mind resulting from such a life. The intellectual life—that of the brain, of thought—that of the mind, in fine, becomes extinct and merges into that of the material life—that of the body and the senses. But, alas! how many moments are there when we become bent down by intellectual pain and exhaustion, if we may say so! The climate of the Sahara is an African one, often excessive, a tropical climate—one of African culture and customs. When the sun shines at its full extent —when we breathe but fire, as it were—even the African ostrich feels such a condition of the atmosphere, and yields to the more nerved

and energetic force of the Arab horse and its rider."

Scientific expedition of the 'Novara,' Austrian Navy.—The number of *savants* who composed this first Austrian circumnavigation of the globe was considerable; and branches of science not generally attended to were taken notice of, as those of geodesy, medico-pharmacology, &c. The popular relation of the journey of the 'Novara,' which extended over 28 months, will appear next spring, with interesting illustrations. The painter of the expedition, Mr. Silleny, will contribute sketches as well to this preliminary work, as to the more scientific details of the several departments which will appear hereafter.

Enigmatic collections of rare books, MSS., and prints.—M. Edouard Laboulaye has given, in the 'Revue des Deux Mondes,' a curious account of some stupendous transaction in the commerce (!) of old books, which brings it near to the manœuvres of the Stock Exchange. M. Laboulaye dilates on the late sale of Signor Libri's collection of books and MSS. in London, as his name has been proscribed by a *civil* tribunal in Paris. The sums at which such curiosities are disposed of now-a-days are extravagant, as 400,000 francs have been paid for a library containing the valueless poetry of Pierre Gringaine with the autograph of Diana de Poitiers. As most of the specimens sold by M. Libri appertain to the Continent, it would seem that curious means have been used to draw them from their former sepulchres, as ten years ago M. Libri arrived in London without one single book, and yet in the year 1859 he publishes two catalogues, containing 1200 MSS. and 3000 other specimens. M. Laboulaye makes some further observations on this subject, for which we refer our readers to his clever Essay as above.

Munich. Stereochromy, a novel sort of Fresco Painting.—The King of Bavaria has caused some stereochromic pictures to be executed on the north wall of Liebig's laboratory. Professor Pettenkofer is making experiments on the production of a solid and unalterable groundwork, and the subsequent fixing with water-glass (*Wasserglas*). The reasons why painters have not succeeded hitherto with stereochromy are now completely removed; and every one may now accomplish what Kaulbach has done in Nüremberg and here. These pictures equal frescoes in the intensity of light, and surpass them in the brilliancy and harmony of colours. The foreign artists here who study stereochromy will transplant it to their own countries,—Rahl to Athens, where he will execute some cartoons for the University; Maclise to London, for some pictures in the Houses of Parliament; and Tacye, who has to paint some specimens for the Ghent University. Thus the art of stereochromy, discovered by Fuchs in Munich, is now spreading far and wide. The paintings executed by Loeffler in the Munich Laboratory represent two landscapes of Palestine; and Thiersch has painted two colossal figures—the Science of Chemistry, and a Pomona as an adjunct of Agriculture.

[This art has not yet received in England the general attention it so justly deserves. It is very easy to perceive that Stereochromy, like any new pictorial contrivance, will exercise an ultimate influence on Photography.]

Berlin Cartoons.—The place of Director of the Berlin Academy of Art having remained vacant for a long while, the appointment of Ritschel from Dresden scarcely gives adequate satisfaction, as there must be some hidden reason why Cornelius, who is still strong and laborious, did not obtain that important situation. H. Grimm has just published a little Guide to the Cartoons of Peter Cornelius in the saloons of the Royal Academy of Arts at Berlin, in which, after the description of these *chefs-d'œuvre*, a philosophical essay on the life and works of the great master is given.

Houses of the Moors in Algeria.—It is clear that the indigenous (native) architecture of a people is that which, according to the experience of centuries, suits best their climate, their health, and comfort. Thus the houses of the equatorial zone (being one of extreme heat and wet) are open to every wind; and their high, thick, and large roofs, overlapping the edifice, protect their dwellers against the equatorial torrents, while they allow them air and light, those solaces of the human kind. The houses of the Algerine Moors are calculated for a climate at the same time hot and dry, which during the middle of winter requires only the aid of a small fire. The exterior of the houses is constantly whitewashed, that it may reflect and not absorb the rays of light. A thick wall protects the inmates against any sudden change of temperature; narrow and high-placed windows prevent the entrance of air heated by the sun or damped by rain, and admitting air without the reflection of the burning outside soil. The inside walls are composed of *fayance* tablets, solid, cool, and easy to clean. The roof consists of terraces, where the sensuous oriental can abandon himself to quiet repose or a dreamy reverie.

On a new Panoramic Lens.

To the Editor of the Photographic Journal.

St. Brelade, Jersey, Sept. 29, 1859.

Sir,—I dare say some of your readers will

be interested in hearing that I have lately invented a Panoramic Lens, which will include an angle of 120°, with sharp definition to the edges, and gives an image equally illuminated. The lens is achromatic; and the picture can be taken upon a cylindrical surface without involving any practical difficulty. It appears to me a very important invention, since the pictures will not only include an enormous field of view, but be free from the bad marginal definition and the distortion produced by the common lenses. I believe the lens will be found a quick one, and suitable for skies and instantaneous pictures.

I have patented the invention, and cannot immediately furnish you with more than the above brief particulars, but will, as soon as possible, forward you some prints and let you see the apparatus.

THOMAS SUTTON.

Fothergill Process.

To the Editor of the Photographic Journal.

SIR,—Though fully agreeing with Mr. Hall in all he says regarding *simplicity, certainty,* and *beauty of results* obtained by the "Fothergill Process," I cannot but dissent from his opinion that attention to minute details, such as using a particular amount of water &c. in the preparation of the plates, is unnecessary.

The successful practice of the "Fothergill Process," as well as all others, depends upon fulfilling, in some way or other, certain fixed requirements; that plan, therefore, which allows least latitude for departing from these is nearest reducing it to a certainty.

By the mode of proceeding Mr. Hill advocates, success *chiefly* depends upon the *skill* and *knowledge* of the operator, the *number* of immersions necessary being *influenced by temperature,* double or treble being required with a low compared with a high one; and one immersion in excess will considerably deteriorate sensitiveness, or the reverse produce it unevenly.

If, however, the exact amount of water necessary for reducing-bath on the surface of the sensitized plate (and which, if continued in contact a few seconds longer than actually necessary, does no material injury), the most suitable manner of applying it, and the time necessary for its complete union with the bath-solution under different variations of temperature are ascertained and attended to, the operator is little likely to err in this most important part of manipulation.

That very excellent and certain results *can* be obtained, by the plan Mr. Hall practises, in the hands of a skilful and observant operator, I do not doubt; for Mr. Prichard, who was the first and for a time the only *continuously* successful operator, procured very beautiful negatives with a great amount of certainty with one essentially the same; but I have good reason for knowing that it was too deficient in *minute particulars* for manipulators generally.

As I fear, if his remarks be allowed to pass unnoticed, some not so expert as Mr. Hall may fail to obtain in the method he recommends equal success, and in their disappointment may unjustly condemn the process, I have been induced to trouble you with these remarks.

ALFRED KEENE.

Archer Testimonial Fund.

To the Editor of the Photographic Journal.

Preston, Sept. 30, 1859.

SIR,—Touching the Archer Fund, permit me to suggest to the Committee that one, two, or three names of respectable tradesmen, dealers in photographic apparatus, in each town, be obtained, and there be issued to them (no leave or permission, I am sure, will be needed) a book with an authority to collect subscriptions towards this very laudable object, forwarding with the book an intimation that the moneys collected be sent to the Treasurer on such a day—say six weeks from date of issue.

By these means I am sure a considerable sum of money may be obtained.

I enclose my card, and beg to state I shall be happy to carry out in this town what I have suggested above.

P. P., Jun.

On the Variations produced in placing the Stop, by altering the size of the Diaphragm. By M. LABORDE.

AFTER having placed the stop with a small diaphragm, if we withdraw the latter so as to leave the whole of the lens open, the image becomes confused, not only on account of the spherical aberration, but also because the ground glass is no longer in focus; this must be brought somewhat nearer the lens, in order that the image may become clear. The following experiment will be a better proof of this anomaly:—Prepare two diaphragms, the first with a narrow opening in the centre, only permitting the passage of the rays which cross the *centre* of the lens;—the second entirely closed in the centre, with a circular slit near its circumference, only allowing those rays which cross the *edge* of the lens to pass. Having placed the first diaphragm on the lens, we place a stop on a delicate subject, the image of

which we bring into the centre of the ground glass; we then substitute the second in place of the first diaphragm. The image is then no longer in focus; to bring it to that, we must draw the ground glass nearer the lens. Having done this, when the whole of the lens is exposed, both the preceding images are found, each with its different focus. They are, moreover, accompanied by all the images that could be obtained by gradually approaching the circular slit of the second diaphragm, and which have their intermediate between their two extreme foci. All these different foci necessarily produce confusion in the only image we perceive—an image of a certain substance, in which the mean term of its greatest clearness removes from the lens in proportion to the narrowing of the opening of the diaphragm. In the ordinary practice of photography no uneasiness need be felt with regard to the variability of the focus, because that is most surely obtained by the eye alone; but, after having copied a subject with a small diaphragm, we must be especially careful if we wish to produce a second image by leaving the lens entirely open.—*Cosmos.*

REVIEWS.

Instructions for the successful Practice of the Fothergill Dry Process, &c. By ALFRED KEENE.

IN this little pamphlet Mr. Keene exhausts the subject of the popular Dry Process, the principles of which originated with Mr. Fothergill, but which owes its practical details in a great measure to the careful and patient investigations of the author.

Mr. Keene states in his introduction that he has "endeavoured to anticipate and provide a remedy for every probable, if not possible, cause of failure, even to the most inexperienced." This promise is fully borne out in the body of the book, which contains, besides a minute and clear description of the process as usually practised, an account of several new and convenient contrivances, which seem calculated to materially facilitate the manipulation of dry plates.

A short account of other preservative processes is also given, including the Taupenot or Collodio-Albumen, the Honey, Oxymel, and Metagelatine methods.

Mr. Keene has also favoured us with the experiences of some of the most successful operators, practical men; and this is not the least valuable part of the book. The near approach which Mr. Bright's pictures assume to the best wet-collodion prints, no doubt, is in a great measure due to the developer, which he has communicated to the author:—

Powdered gallic acid	1 drachm.
Glacial acetic acid	1 drachm.
Alcohol	1 drachm.
Distilled water	20 ounces.

Put the whole into a bottle, and shake occasionally during several hours. When required for use, filter, and to each *ounce* add from four to six drops of a ten-grain solution of silver. Put sufficient of this into a suitable-sized developing-tray, in which place the plate or plates, sensitized surface upwards; the developing solution should well cover the surface of plate; and the whole must be covered, to exclude even yellow light, unless quite free from actinic rays. No agitation is necessary, nor any further attention than occasionally examining whether sufficiently developed. The development is slow, occupying from about an hour upwards.

This method must preserve the half-tints.

Three Visits to Madagascar, during the years 1853, 1854, 1856, including a Journey to the Capital. By the Rev. WILLIAM ELLIS. Illustrated by woodcuts from photographs.

(Continued.)

"I had not yet ventured to make any use of my photographic apparatus, not feeling quite sure how it might be regarded; but on this day a note came from an officer of the palace, saying that the prince wished to have his likeness taken, and would come for that purpose on the following morning. As I had my dark room to arrange, camera to unpack, and chemicals to prepare, I could not possibly be ready by the next morning; and wrote to say that I should be happy to take the likeness of the prince as soon as my materials were ready.

"I had a succession of visitors throughout the day; and about seven o'clock in the evening, as I was sitting in my inner room, the young chief who had accompanied me from Tamatave came in to say that a sick person with some friends had come to see me. I said, 'Ask them to come in.' When the door opened, they brought in a palanquin, which they placed on the table in the outer room, and, after removing the covering, raised up a thin, feeble, gasping woman, her husband, relatives, and attendants, to the number of nineteen, all standing round. Her husband stated that all the native medicines deemed likely to be of any service had been resorted to in vain, and the patient was so feeble as to be unable to sit up, and could scarcely take any food. I did

not expect much benefit would result from any medicine I could give; but I spoke kindly to the sufferer and her friends, and promised such medicine as I thought most likely to afford relief. The poor invalid expressed her great pleasure at having seen me, and said she should be grateful if it should please God to restore her to health. After conversing some time, the feeble sufferer was gently laid down in the palanquin by her female friends, and carefully covered over, when the bearers came in, took up their burden, and, followed by the husband and friends, carried her back to her home, which I was told was at some distance.

"As soon as I was up the next morning I was asked to go and see a number of sick persons from a distance, who were in an adjacent house. I found a whole family—the mother with an infant in her arms, and three other children—all suffering from what seemed to be a severe attack of influenza. When I had spoken to the mother, the father asked me if I could afford any relief to a young woman who had come with her, who had been struck by lightning and was deaf. He then pointed to another in the company, who, he said, was an orphan, and a martyr's child. While engaged with this little company of sufferers, I was sent for to my own house, where I found an officer from the palace, who asked for some medicine for himself and his children, and who also told me that the queen was waiting for what the diviners should declare to be a lucky day, in order to receive the presents I had brought. I mentioned my want of a table for photographic purposes, and in the course of the afternoon one was sent from the prince's establishment; and a right royal table it was—so large and heavy, as only with difficulty to be got into the house.

"Amongst my visitors in the evening were a chief and one of his companions, who had been during the past year to Ibali. He stated that, in consequence of reports of a foreign teacher being at Ibali, a place on the western coast of Madagascar, a letter had been written stating that they had heard of his arrival, but did not know whether he was English, or French, or American, and that the bearer of the letter had come to see him. My visitor, accompanied by five others, had undertaken to convey this letter. Their equipment consisted of two guns with amunition, a spade to dig up roots with, a knife or hatchet, with beads and buttons to barter for provisions on their way. After journeying through forests and swamps, over rivers and mountains, sometimes almost famished for want of food, they approached the western coast. There they were met by a party of Sakalavas, the people of the country, who seized them, plundered them of their guns, &c., stripped them of their clothes, and then sold three or four of them as slaves to an Arab trader who was on the coast in a small vessel. From him they were transferred to the French authorities at Nosibé, an island on the north-west coast of Madagascar, whence they were to be sent to Bourbon to be engaged as free labourers for five years.

"Before leaving, however, the letter of which they were the bearers had come to the knowledge of the French authorities, who, in consequence, kept these men at Nosibé, and sent other men, taken out of the prison, to Bourbon in their stead. At Nosibé they were treated with great kindness by the Roman Catholic priests, who took them to their places of worship and endeavoured to instruct them in the Roman Catholic religion. Afterwards they sent them to Bourbon, where the priests showed them much attention, and endeavoured to induce them to regard their religion with favour. They were afterwards sent to the Island of St. Mary's, on the east coast, also occupied by the French; whence they proceeded to the mainland, and then hastened up to the capital.

"I was deeply interested in the account which the chief gave me of many of the incidents of the journey, of the former part of which he subsequently furnished me with an account in writing. He spoke of the uniform kindness they had received at Bourbon, and of the endeavours made to induce them to stay. But they did not appear to have been at all inclined to adopt the religion of the people. In a letter which some of the natives wrote, after repeated conversations with those of their countrymen who had been in Bourbon, they said, 'It seemed as if the Pope stood (in authority) in the place of God, and that the priest forgave sins. And as to the images, &c., before which they prostrated themselves, it was like the *sampy* or idols of our own country.' This appeared to be the impression which the reports of the travellers had made on their minds. However much I might deem the teaching of the Roman Catholic priests to be erroneous, and however the Romish system might, in my apprehension, tend to hinder rather than help the people in their endeavours after knowledge, improvement, freedom and expansion of thought, as well as social elevation, I could not disapprove of the endeavours of the priests to make the strangers acquainted with their creed and modes of worship, but was not surprised to find that it had not commended itself to their judgment and approval.

"In the evening I received a visit from one of the highest officers in the government. He was a remarkably handsome man. His features

were small and quite European, though his complexion was almost black. He was splendidly dressed, and accompanied by two aides-de-camp, also fine, noble-looking men. After a long and interesting conversation, my sensible and really intelligent visitors took their leave.

"I then resumed my preparations for taking the likeness of the prince, who had sent to inform me that he should come in the morning. I had finished all, except adding the acetic acid to the developing solution, and the rectifying of the bath; but no acetic acid could I find. The case of chemicals put up by Messrs. Hopkins and Williams was examined again, and all the bottles taken out; many that I seemed likely to want, and some things that I never seemed likely to want, were there, but neither acetic acid nor any other fluid acid. Every other box or case in which it was even likely to be was examined, but with no better success; and about midnight I gave up the search, and wrote a note to be taken by a friend to the prince at daybreak, to say I could not possibly take his portrait in the morning. I then examined all my invoices, and, to my dismay, found no acetic acid there. My friend Mr. Fenton had assisted me in making out the list, and I had the most distinct remembrance of speaking about it at the time; but how it came to be omitted is still a mystery. My perplexity was great; and I am sure all photographers who have been in similar circumstances of destitution, in a country where there were no chemists' shops, and no fellow-photographers of whom to borrow, will be able fully to sympathize with me.

"I had scarcely finished breakfast when the inquiry I had anticipated came from the queen's secretary,—when could I take the likeness of the prince? I replied, as soon as I had finished making the 'strong water,' one of the ingredients for which I had not yet found. The secretary was accompanied by his wife and three children, for whom he solicited some medicine. Then I had a note from the son of one of the princes, informing me of his illness and asking for medicine. The rest of the day was comparatively quiet.

"On Monday, August 15th, I was again among the chemicals by daybreak, but with no better success; gallic and pyrogallic acids were all I could find. I sent my servant to the market, to buy a quantity of the sourest Malagasy limes he could find, and took some tartaric acid, not very pure, out of my medicine-chest. While I was at breakfast, four officers arrived, followed by a number of attendants bearing baskets of eggs, poultry, and rice as a present from the queen, for which I expressed my grateful acknowledgments, when the officers returned, and I proceeded with my experiments.

"Having received, on the previous day, an intimation that the queen would send for the presents to-day, I had made all ready; and about noon the officers came from the palace to take them to the queen. I had previously arranged them, and made out lists of all the articles. I repeated what I had already stated to the officers, that I had not the treasure of the merchants who sometimes visited the capital, and regretted that my presents were so insignificant, but desired to offer what I had brought as expressive of my grateful sense of the kind reception I had met with and a trifling memorial of my visit. I then handed to them a parcel containing jewellery from His Excellency the Governor of Mauritius; and afterwards delivered to them the boxes containing my presents for the queen, the prince, and the princess, which were to be taken to the palace. Those for the chiefs were to be taken to their own houses.

"Amongst my presents to the queen was a large framed engraving of our own Gracious Sovereign, of His Royal Highness the Prince Consort, together with a large coloured print of Windsor Castle, also in a gilt frame. I had heard that there were good-sized plates of the portraits of the Emperor and Empress of the French in the palace; and the officers, when they saw the portraits of Queen Victoria and the Prince Consort, said they thought they would be acceptable to their queen. The presents for the prince royal and the princess were arranged separately. When the officers had ascertained that the articles accorded with the lists, their own attendants and two of my men carried them to the palace. Amongst the presents were a number of articles which had been kindly contributed by my friends at home, and, though in many instances of simple and inexpensive material, their value was enhanced by the beautiful forms into which they had been wrought by skilful and industrious hands."

(To be continued.)

ANSWERS TO CORRESPONDENTS.

If any gentleman, whose name has been accidentally omitted in the List of Subscribers to the Archer Fund, will forward the same to Sir William Newton, or to the Editor of this Journal, the correction shall be made in our next.

October 10, 1859.

Sir,—Much obliged for your advice in last Journal about developing Fothergill plates, but I cannot understand how to develope a dry plate with sulphate of

iron unless silver be added; in which case I should expect the solution to become turbid long before the two hours were over, which, you say, are necessary for the development.

Must nitrate be added? Is there any advantage in increasing the strength of the pyrogallic solution above 2 grs. to the oz.?

The exposure has evidently been much too short in the Swiss views, though I have good pictures of Coblentz and of Paris taken with a similar exposure, nor did I find it too short for *foliage* in this country.

J. M. S. B.

In the last Exhibition of the Photographic Society of Scotland, some prints were shown by Mr. Kibble. They were from dry plates instantaneously exposed; and it was stated that they took frequently ninety hours to develope—the solutions for development being occasionally renewed. No doubt the developer becomes turbid in time and, when, much so, must be replaced with fresh, although a little decomposition is not very important. A friend, who has met with much success, frequently has allowed his negatives to remain all night under the influence of the developing fluid, and has obtained very valuable results. Do not increase the strength of your developers. A picture slowly brought out, especially if under-exposed, is always the best, as you must be aware from your own experience that the actinic rays are so different on days which to our senses are almost similar, that you must not be surprised at your varying success.

E. M. (Bruges.)—Your communication on the chemistry of albumen has not come to hand. With much pleasure your request shall be attended to.

Perth, Sept. 29, 1859.

Dear Sir,—I have looked anxiously in your valuable Journal for instructions as to the best mode of obtaining stereoscopic copies of engravings and other flat pictures. In the Number of your Journal, October 21, 1858, p. 48, is an extract from 'The Times,' mentioning that they had had laid before them some specimens of such stereoscopic copies. I can find no further allusion to the matter; and if you can, in your Correspondents' column, give me any assistance as to how I can obtain such pictures with the ordinary stereoscopic apparatus, I shall be greatly obliged.

Enquirer.

The slides for the stereoscope, which have been produced, were obtained from prints cut up, and the figures or other objects slightly removed from their original position; consequently any drawing or print is entirely destroyed in the operation, and this circumstance alone, to say nothing of the poor results produced, will induce few to follow out this method.

A. Z.—The effect produced is undoubtedly caused by dust. When the plate is immersed in the bath the impurity is washed off, and thus transparent spots are caused, with comet-like tails, all being in one direction. Your varnish is also very bad.

October 8, 1859.

Sir,—1. I shall be obliged if you will tell me the cause of, and how to prevent, the negative cracking as it has done, as you will see by the enclosed prints; in the unmounted one it has just commenced, and in the mounted has spread nearly half over it. They were both originally perfect. It is not the first time a similar damage has occurred with me, and I have no idea why,—as far as I am aware, treating all the negatives in the same way.

2. There is another thing which I cannot account for; it is this. Sometimes on sensitizing albuminized paper in the ordinary 60-grain silver solution, on raising the paper a deposit similar in appearance to chloride of silver drops from it, removing the albumen partially, by which I mean that it is removed irregularly, although, when removed, it is gone entirely. But the most singular thing is that, though all the paper is unaffected to a certain time, where this arbitrarily occurs, all the other paper is similarly affected by the same solution, thereby rendering it useless. If you can suggest the cause and remedy, you will oblige,

A Constant Reader, at Kensington.

1. The damage in all probability comes from keeping your negatives in a damp place, the peculiar net-like markings resulting from moisture penetrating under the varnish film. If your negatives have not been *thoroughly* washed, of course this is very apt to occur; we have seen negatives destroyed by this cause after they have been kept for a very long time. Before varnishing a negative, clean off the edge of the collodion all round, as much as you can allow, and make the varnish flow quite up to the edge of the glass. 2. The same effects, we have often experienced in using the paper of a certain maker, and attribute it to an excess of the chloride being used in its preparation. It seems to occur when the nitrate becomes weak from frequent use. If kaolin is used to filter an exciting solution, often a particular want of brilliancy occurs in the proofs, and the albumen is partially removed from the surface of the paper.

H. Lewinton.—So many causes may produce the deterioration you mention, that it is almost impossible to reply without further information. Do you use a gutta-percha bath?

H. W. S. (Hunton.)—1. We have never found the collodion of the make you name deteriorate so quickly. Was the bottle perfectly clean in which it was mixed for use? 2. A strip of zinc in the collodion will not injure either the collodion or bath. 3. The defect in the picture is caused by some impurity in the glass. A very small degree of greasiness will cause the silver-like appearance if iron is used.

Sir,—There has been a great deal said about the poisonous effects of cyanide of potassium when absorbed through the skin, but, as far as I can discover, very little to the purpose. My object in writing is to know if there are any well-authenticated cases of its deleterious effects when used externally for washing the hands, or from its fumes.

H. A. H.

We have known several instances in which we believe photographers have suffered much from the use of cyanide. It is quite certain that some persons experience no perceptible ill effects; the same individual may use cyanide day after day for a long time, but at length, from some peculiar state, very serious results have taken place. A friend well known in the photographic world has lately been incapacitated from following his pursuit, and lost a joint of his finger, which, in the opinion of some of the ablest medical men, was entirely the result of the absorption of this poison. Others we know who experience headache and nausea from the smell; and in another instance the use of it produces diarrhœa; then why should it be used, when a harmless substance may be equally well employed?

Letters of inquiry to the Editor can be answered only through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. Taylor and Francis, Red Lion Court, Fleet Street.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 91. NOVEMBER 15, 1859.

We shall, in our next Number, have the pleasure of presenting to our readers a specimen of a new mode of printing photographs in permanent carbon ink. Several plans have been hitherto tried to ensure stability, which have, more or less, failed to attain the desired object.

The process which Mr. F. Joubert is about to introduce seems to answer the purpose admirably, and the prints which we saw a few days since appeared to us in every respect similar to impressions obtained by the copper-plate printer.

Should this new mode realize the expectations of the inventor (and we candidly believe that it will), it will create quite a revolution in the mode of printing photographs as hitherto practised.

The Society will open their Seventh Annual Exhibition early in January, in the Gallery of the Society of Painters in Water Colours, 5 Pall Mall. A Committee has been formed for the effectual carrying out the arrangements, who trust to receive support and contributions from all skilful photographers. Photographs illustrative of any special or new process will be admitted, though they may not excel as works of art. The Society are anxious to keep a record of the progress of their Exhibitions, and they will give their best thanks to intending exhibitors for a second *unmounted* copy of any of their works, which will be preserved in portfolios for future reference.

Any duplicate copies, or the prints themselves, which were exhibited at former Exhibitions, will aid the objects of the Society.

The following are the Rules for the Exhibition:—

"The Photographic Society of London will open their Seventh Annual Exhibition of Photographs early in January, in the Gallery of the Society of Painters in Water Colours, 5 Pall Mall.

"The Exhibition will not be restricted to Members of the Society, but open to all, subject to the following regulations, viz.:—

"1. Negative and Positive Photographs of every description, whether on paper, glass, or other material, including Daguerreotypes, will be admitted, and also Stereoscopic Pictures and Stereoscopes.

"2. Coloured Photographs will be admitted only when accompanied by untouched copies of the same pictures.

"3. Positive Pictures, printed from touched or painted negatives, and also touched or painted positive proofs, must be described accordingly.

"4. For the sake of economizing space, the margins of all Mounted Photographs must be kept within moderate limits, viz. not exceeding 3 inches for the largest pictures, or 2 inches in those under 8 inches by 6 inches.

"5. Pictures sent for exhibition must be numbered consecutively, and accompanied by a schedule in the subjoined form. Every Picture must be protected by glass, and bear on its front a duplicate of the entry on the schedule referring to such picture.

"6. All Pictures with advertisements will be rigidly excluded.

"7. Exhibitors desirous of selling their Pictures will be permitted to make arrangements for that purpose with the Attendant in charge of the Exhibition.

"8. Facilities will also be given to the Makers of Photographic Apparatus, &c., for the exhibition of such of their productions as may be considered of peculiar interest from excellence of construction or novelty of invention.

"9. All works intended for exhibition should be addressed to the Secretary of the Society, and delivered at the Gallery, 5 Pall Mall, with all expenses paid, on the 27th of December.

"Exhibitors and Members of the Society will have the privilege of free admission, and of introducing one friend without payment.

By order of the Council,

Hugh W. Diamond, M.D., *Secretary*.

Exhibition of the Photographic Society, 1859.

Name of Exhibitor or Photographer.	Address.

No.	Description.	Process.	Price.

Although we were disappointed at the absence of a gentleman who was expected to have read a communication at our last meeting, the future is full of promise. Mr. Ennel will, at the December Meeting, deliver an address on Photographic Manipulation and Contrivances. The January Meeting will be occupied by Mr. Hardwich. The Report of the Collodion Committee will be early considered. Mr. Thurston Thompson and Mr. Mayall have each kindly consented to give their aid on future evenings of the present session. The Council will be thankful for the cooperation of any other photographers who will give their assistance, and by early communication with the Secretary, an evening may be allotted, and due notice given to Members of the subjects which are likely to be brought under discussion.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

PHOTOGRAPHIC SOCIETY.

Ordinary General Meeting.

Tuesday, November 1, 1859.

The Lord Chief Baron, F.R.S., President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The Viscountess Jocelyn; Frederick J. Smith, Esq.; Captain Rooke, Scots Fusileer Guards; F. Joubert, Esq.; Braham La Mert, Esq.; Alfred Keene, Esq., and C. Silvi, Esq., were duly elected Members of the Society.

The Secretary read the following letter:—

To the Editor of the Photographic Journal.

Sir,—I send you some extracts from a review in last week's 'Athenæum' of the life of Samuel Crompton, inventor of the spinning mule, which remind me so mournfully of the present state of the Archer Fund that I cannot forbear sending them to you:—"The country owed him much, and every day owes him still more. In 1811 above 4,600,000 mule-spindles made by his pattern were in use; and, in 1842, when Government assigned him £5000 as a national reward, the duty paid by cotton imported to be spun on his machines came to over £1000 a working day. At the present time it is calculated that if every mule-spindle now working were to subscribe one shilling each, a sum of £1,500,000 could be realized. In France alone there were in 1850 about 3,000,000 spindles on Crompton's principle; and one firm of mule makers (Hibbert, Platt, and Co.) make mules at the rate of 500,000 spindles a year. The immense impetus given to trade, money, civilization, and comfort by this invention is almost incalculable. Mr. Bright said the other day, 'We should relapse into barbarism if Crompton's spindle-carriage were taken away.' And it has been also said that he contributed as much as Wellington to the downfall of Napoleon. Yet this was the man to whom the nation decreed a reward of £5000.

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"He counted on a large subscription, according to an agreement drawn up between him and some of the principal men of Manchester and Bolton; but he did not clear £60, and lost

for ever the right of making a fortune of his invention. A private letter gives us the following information, which we throw in as some addition to the mass of notes afforded by Mr. French:—'When he found he could no longer preserve his secret,' says this letter, 'he went to Mr. Pilkington, and consulted him what he should do. Mr. Pilkington was permitted in confidence to see the machine; and it is clear from the nature of the agreement that others than he must have been permitted to do so likewise, probably at Mr. Pilkington's request, to enable him to advise. Among them was Robert Peel, the father of the eminent statesman, who brought with him two mechanics, who knelt down, examined and measured the machine, and mastered its construction. Peel, and the firm to which he belonged (then in the height of its prosperity), subscribed *one guinea collectively*; and when Sir Robert took away the plans of the machine, he offered Crompton sixpence a piece for the two workmen's examination and measurements.' As soon as Peel and his mechanics had mastered the construction, he made mules in his own factory, and entered into competition with the inventor.

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"When the time for calling in the subscriptions came round, many who had put down their names for so much in the agreement refused to pay. The firm of Peel, Yates, and Co., of Bury, certainly gave their single guinea honourably enough (the firm of Peel, Ainsworth, and Co., of Bolton, did not subscribe at all); and when everything was gathered in, expenses deducted, and loss of time accounted for, Crompton found himself possessed of less than £60,—just so much money as built him a new machine with only four spindles more than the one he had given up..... So much for inventors and their gains."

Now for the application. £618 6*s*. 9*d*. invested in Consols for the children of the late Mr. Archer is not enough. The interest, with the £50 per annum from the Government, will make only £80* per annum for the three children. I well remember the sad fate of our late benefactor when he told me that he "invented a new camera every year;" and now, when picturing his children luxuriating upon £80 per annum, I cannot but say, "So much for inventors and their gains!"

Pray, Sir, stir up the profession to an act of bare justice! Enriched by Mr. Archer's invention, surely we shall feel a pleasure in sending his children into the world in a position equal to that which they might have attained had their father followed his original profession. Surely we are strong and numerous enough as a body—professional and amateur—to support three little children! £50 per annum for each child would probably be sufficient to provide them with a first-class education, so that £100 per annum would be wanted in addition to the Government £50. This amount could be raised at once, if 200 photographers would subscribe 10*s*. each per annum, or 100 photographers £1 1*s*. each; but I should think there must be in Great Britain more than 200 well-to-do photographers who owe their present gains mainly to the discovery of the late Mr. Archer.

I have at present seven photographic businesses, each yielding a certain amount of income, and will therefore subscribe seven half-guineas or guineas per annum during the next ten or fifteen years, if 200, or even 100 photographers will also subscribe a half-guinea or guinea per annum. For my own part, in rendering to the children so small a homage to their father's memory (seeing I cannot give them back their father), I should look on the money each year as a payment—a poor payment—a *very* bare act of justice.

One of the Collodion Photographers.

P.S. I forgot to say that I would propose not to touch the money now invested, but let it accumulate as capital to be divided among the children when they become of age.

* £30 interest upon £618 Consols is an excess.—Editor.

The Secretary stated that the writer of the above letter had communicated his name in confidence.

The Chairman stated that he regretted there were no papers to be read at this Meeting, and announced that there were two or three gentlemen who had promised to make communications at the next Meeting, one of whom was Mr. Ennel; and then asked if any gentleman had any oral communications to make to the Society.

Mr. Roger Fenton said he saw many gentlemen present who he had no doubt had been working hard during the recess. Before they parted at the last Meeting, the question of lenses occupied a great deal of attention; and to begin a discussion he would state that he had been working with three of Ross's orthographic lenses, comparing them with others by the same maker, and certainly he (Mr. Fenton) must confess that for landscapes he preferred the old combination. He had tried the orthographic lens for portraits for copying, and found that, if the picture was not too large, the lines were certainly very correct; but in forcing the lens beyond that which was legitimate, as one was obliged to do for landscape work, the variation of the lines of the orthographic lens was more objectionable. It also had the great defect that it would not give the foreground and distance with anything like a sharp definition. There should be a certain limit for distance, within which every object might be rendered comparatively distinct; and he could not get sufficient

depth of focus to satisfy him as an artist. If by using a small stop any gentleman had been able to produce satisfactory results, he (Mr. Fenton) would be glad if that gentleman would communicate the result of his practice to the Society. There had been a lens constructed by Sutton, which was said to produce great results; perhaps some gentleman who had been working with that lens would communicate the result of his experience.

Mr. Bedford had tried it but little this summer, because when he did try it he found that it possessed very few advantages over the old landscape combination, and those advantages were in rendering architecture, in which case there were advantages in rendering flat surfaces with less convergence in vertical lines. For landscapes, the old form of lens was decidedly the best in focal depth and sharpness. The same results could be obtained by the orthographic lens, but it must be stopped down to such an extent as to make the time become of importance.

Mr. Shadbolt thought it advisable, in a discussion upon lenses, first of all to state what were the qualities required in a landscape lens, and that then they would be in a condition to judge whether the examination had been properly carried on, in order to compare the one with the other. There were certain qualities in a landscape lens which must be regarded, and which were not yet up to the requisite points of perfection: definition was one; absence of all but a moderate amount of distortion was a second point. With regard to rendering foreground and distance tolerably perfect, it seemed to be forgotten that that was a question not of actual aperture, but of angular aperture; and the reason was, that it was limited to a certain amount of pencils of light; and if the aperture were increased through which those rays were to pass, there was brought into play a power which one eye alone never possessed. The moment a lens was brought into play with an aperture of 2½ inches, a confusion was caused by the superposition of the picture seen by the right eye appearing on that of the left; the aperture of that lens must be reduced to, certainly not exceeding, a quarter of an inch. He made these remarks because he perceived there was a little confusion of ideas in certain minds upon this point. Therefore, to compare a lens of large size and long focus with a lens of small size and short focus, if, on the contrary, they were taking a flat surface, then it was not actual, but angular aperture that must be regarded. With regard to the orthographic lens, he thought that there was one point which had been forgotten by Mr. Fenton. In noticing that the foreground is not rendered well, he did not state whether he used a camera with a swinging back; and certainly without, a foreground with moderate distinctness ought not to be expected; and one of the principal uses of the orthographic lens was, that in architecture the photographer often could not get a sufficient distance from the object to get it all in properly, and a very curious defect of that lens is sufficient to bring that right. It was well known that parallel vertical lines taken with an orthographic lens, curved with their ends diverging from each other; so that in taking a square tower or a round tower, with a camera looking upwards, with an ordinary lens a cone would be produced: but an orthographic lens remedied that; and unless too great an amount of variation were used, only a slight enlargement of the base, and nearly parallel lines at the top, would be produced.

There was also one advantage which he did not recollect to have been observed upon—that by removing the back combination of an orthographic lens an ordinary landscape lens was produced of much less focus; so that by purchasing an orthographic lens two lenses were obtained, one of which could be applied to a small camera, which was sometimes of consequence in journeys.

The Secretary stated that he had received a letter from Mr. Joubert, who had that evening been elected a member, and who had invented a new mode of printing. Mr. Joubert stated in his letter that he had obtained a result which he would show, if Dr. Diamond would pay him a visit. He (the Secretary) had seen the result; but Mr. Joubert did not describe the mode of production. The inventor also says he will present to the subscribers of this Journal each a copy of his work. It was a direct picture from the original print or life, of extreme cheapness; and it appeared that a very large number were able to be taken off in a few hours. To accompany the next number of the Journal, he will present the Society with 3000 prints at his own expense.

The Chairman thought it had been said that gratitude was a lively expectation of favours to come. It was right the Society should thank Mr. Joubert for his promised liberality. Perhaps he (the Chairman) might state what he believed to be the result of the communication, viz. that if Mr. Joubert were presented with anything in nature or art, either something already taken in photography or in print, in the shape of a picture or engraving, first allowing it to be put in the shape of a photographic negative, he would then multiply copies of it to any extent. Of course the manner in which that was done was a secret at present.

The Secretary stated his belief that Mr. Joubert did not intend to patent his process.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

Fourth Session.

First Ordinary Meeting, Nov. 8th, 1859.

W. Scott Elliot, Esq., in the Chair.

The Minutes of the preceding Meeting were read and approved.

Mr. Alexander Monro and Mr. Robert Struthers were elected Ordinary Members.

Conversazione.

After the formal business, a *conversazione* was held, at which were exhibited collections of photographs, new apparatus, and other objects of interest connected with photography.

Some remarks having been made regarding the new "preservative cases" for keeping sensitive paper, a Member stated that a circumstance in connexion with the preservation of prepared positive paper had lately come under his notice, which he thought deserving of the attention of Members. A friend had prepared several sheets of positive paper, and had hung them up to dry in a dark room. Circumstances prevented his using them, however, for upwards of a month, during which time he had not had occasion to look at the papers. When he again saw them, he was surprised to find that not only had they preserved their original white colour, but on printing on them they gave equally good re-

sults with paper freshly prepared. The only explanation he could give of this was, that there was a barrel containing a quantity of chloride of lime in the room, which, notwithstanding the dampness of the season, had kept the air in the room perfectly dry, and had so prevented any decomposition taking place in the papers.

Mr. Tunny said that the great objection to the ordinary ammonio-nitrate paper was, that it spoiled rapidly after being sensitized. He had recently, however, found a method of modifying the preparation of the paper, by which not only were better results obtained, but the operator was enabled to keep the paper for a good many days after it was sensitized. The modification consisted merely in adding citric acid to an ammonio-nitrate solution, sufficient to redissolve the precipitate which is at first thrown down.

A Portable Camera was exhibited by Mr. Nelson, Photographic Apparatus Maker, Clyde Street. It was essentially the same as that exhibited to the Society by Mr. Kinnear in 1857, and of which an engraving and description appeared in the 'Journal' for 1858 (vol. iv. p. 165). In the camera now exhibited, however, the method of affixing the back part or frame of the camera, A B C (see fig. 1, vol. iv. p. 166), which contains the slides and ground glass, to the bottom or sole, G H K, was modified with a view to dispense with any screws or other small detached parts, so as to enable the apparatus to be more quickly put together, as well as to avoid the risk of any small part being lost. Accordingly, the "tongues" of two dovetails on the bottom (and also on the side, to allow upright pictures being taken) of A B C were made to fit into corresponding dovetail "grooves" in the sole G H K, which very firmly attached the two together and prevented the slightest motion in A B C. The tongue and groove of the dovetail were bound with brass, to prevent the possibility of shrinking or breaking. The forked camera-head L M had a couple of brass struts against the front part of the sole H K (the screw P being dispensed with), by which it could be secured at any required angle,—it being intended by enclosing the camera-head, and with it the lens, to effect the same result as is usually obtained by means of a heavy and bulky "swing back." This camera, however, did not possess the horizontal movement which those with the ordinary swing back have.

Mr. Kinnear exhibited a Portable Camera for pictures 14 × 11½ inches, which he had made last summer, similar in general form to that which he had exhibited to the Society in 1857, but possessing a new arrangement of swing back. That portion of the back half of the sole G H K (vol. iv. p. 166, fig. 1) upon which the frame A B C containing the slide and ground glass rests when the camera is put together, is hinged to the part of the sole immediately in front of it, so that when the frame A B C is screwed on, it may be inclined at the top toward or from the lens as the subject may require. The frame can be fixed at any degree of inclination by means of a binding screw at the bottom. The holes F F, in fig. 3, through which the screws pass by which the frame is attached to the sole, are about one inch long, so as to allow the screws, before being tightened up, to have considerable room for playing backwards and forwards, to admit of a *horizontal* swing motion in the frame A B C with the slide and ground glass. *Vertical* and *horizontal* motions are thus obtained for the camera-back, without adding, as the usual arrangement of swing back does to an inconvenient extent, any greater weight to the camera. The screw P, for fixing the camera-head L M at right angles to the sole, is dispensed with; and brass struts, hinged at one end to the front half of the sole, abut against the head L M, and keep it perfectly steady. Two brass wires can be attached at the ends to L and M, and unite in a socket half-way towards the back of the camera, through which socket another wire passes, and is secured to the top of the back A B C. This latter wire, sliding in the socket, is long enough to allow of the utmost extension of the body of the camera, and yet permits it to be shortened to one-half its extreme length: it is fastened at any point by a binding screw in the socket. This arrangement, tying the back frame A B C to the head L M, secures the most complete rigidity in the camera.

Mr. Kinnear stated that he had found the swing-back arrangement of the greatest use in taking views of buildings in cases when it was impossible to get sufficiently far away from the building to admit of the whole of it being included in the view, and yet the camera kept horizontal — and when therefore the camera had to be directed upwards. By doing so with an ordinary camera, the perpendicular lines of the building would be represented converging towards the top—the building apparently falling inwards. But if, with the help of the swing back, the slide containing the paper or glass plate were kept perpendicular, or parallel with the building, the lines would be represented without any inward inclination, —although arranging the camera then might involve the use of a smaller stop to the lens. The horizontal motion is equally useful to secure a better focus in cases when one side of

the view is much nearer the camera than the other—such as a view along the side of a street.

This camera was made by Mr. Bell of Potter Row.

During the evening it was stated that the prospects of the coming Exhibition of the Society, to be opened in the middle of December (see Advertisement), were unusually good, and the Exhibition promised to be superior to any of those which had preceded it. Besides the works of Members, promises of contributions had been received from many of the chief artists abroad, as well as in this country. Pictures are to be sent to the Rooms, 90 George Street, on 1st December.

Photographic Society of Scotland. Regulations of the Fourth Annual Exhibition.

49 Northumberland Street, Edinburgh, October 1859.

THE Fourth Annual Exhibition of the Society will be opened on 16th December 1859, and will be closed in February 1860. All descriptions of Photographs will be admissible. It is strongly recommended that each Picture should be Framed and Glazed, with a margin of Mounting Board not exceeding 2½ inches in width all round. It is also recommended that, in the case of Pictures smaller than 9×7 inches, four should be in one Frame; but a Frame containing more than one Picture must not exceed 12 square feet in area.

Each Picture must have written distinctly on the back the Name of the Subject, the Artist, and Owner, the Process (Calotype, Waxed-paper, Turpentine-waxed-paper, Albumen, the different varieties of the Collodion Process, &c.), and, if for sale, the Price. Exhibitors are requested to be careful in specifying the particular Process by which their Pictures are taken, in order that it may be inserted in the Catalogue.

Pictures touched by the brush will not be admissible unless so described.

A Commission of 10 per cent. will be charged on all Sales made during the Exhibition.

Two Silver Medals will be given for the best two Pictures in the Exhibition. One of them to be given for the best Portrait or Group, and the other for the best Photograph of any other subject.

The Maconochie Welwood Prize of £10, to be competed for by Professional Members of the Society only, will be awarded for the best Photograph, other than a Single Portrait. The same Picture cannot be put in competition for the Maconochie Welwood Prize and for the Society's Silver Medal; and Pictures in competition for any of the Prizes must be untouched by the brush, and must be exhibited by the Artist himself.

Works intended for Exhibition must be delivered, carriage paid, at the Rooms, 90 George Street, Edinburgh, on the 1st December next, after which none can be received. A list of the Photographs sent must be enclosed in the case, and a duplicate list forwarded by post to the Honorary Secretary. At the close of the Exhibition, the Pictures will be carefully packed and returned, carriage paid, to the owners.

C. G. H. KINNEAR, *Hon. Sec.*

Some correspondence has taken place between the Rev. Mr. Raven and Mr. Taylor respecting a statement made by the former gentleman, "that he was not consulted as to a word of the Report on Lenses which appeared in this Journal." It appears that the Report was drawn up some months since, against which Mr. Raven made some objections, which were entertained by the Committee at a meeting at which Mr. Raven was not present. No alteration in the Report having been made, it was considered unnecessary to send the Report to Mr. Raven. It appears that his approval of the Report went only so far as the description of the lenses was concerned, which being misunderstood by Mr. Taylor, led to the publication of the Report.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE first meeting of the above, after the vacation, was held on Thursday evening, October 20th, at the Lecture Hall, Carter Street, Walworth.

The Rev. F. F. STATHAM, President, took the Chair, and proceeded to call attention to the business of the evening, prefacing the same with a few words relative to his own election as President, regretting that he had not a more practical acquaintance with photography, and stating as his principal reason for accepting the office that he had no little love for the art itself, and had long been devoted to scientific pursuits. He concluded by expressing the hope that, although not a photographer, he should fulfil the duties of his office to the entire satisfaction of the gentlemen who had so highly complimented him by their choice, and promised to contribute some papers in the course of the session.

The Secretary, Mr. WALL, then addressed the meeting as follows:—

Mr. Chairman and Gentlemen,—This being, in point of fact, the first meeting of the South London Photographic Society devoted to its real business, I may perhaps be permitted to call attention to some few matters relative to its future purposes and existence. The ultimate amount of utility and success which such a society as we represent may command appears to me to be dependent upon the proper combination of certain elements, viz. Photographic Chemistry, Photographic Optics, Pho-

tographic Manipulation, Mechanics as applied to Photographic Apparatus, and, although last, not least, that knowledge of the leading principles of Art without which the learned chemist and talented optician, with all the manipulatory skill of a clever photographer, provided with the best of good apparatus, cannot produce effective or pleasing results. I am sure it will gratify you, gentlemen, to hear that of each and every branch I have enumerated, even at this very early stage of its existence, our Society has efficient representatives. Our President, the Rev. F. F. Statham, is a gentleman well known for his acquirements in chemistry and for his general scientific attainments. One of the celebrities of the photographic world, Mr. Sutton, has publicly and gracefully announced his obligations to this gentleman for his earliest knowledge of chemistry. Our Vice-President, Mr. W. Ackland, as a photographic experimentalist and the author of several works upon the different branches of our art, is doubtless known to most of you. Mr. G. Shadbolt, a gentleman whose attainments in every branch of photography are known and valued wherever photographers exist, is, I am proud to say, also one of our members. My friend Mr. Noldwritt, a gentleman of varied accomplishments, has watched the rise and progress of photography with no small amount of study and interest, and beyond doubt is in the possession of much information of an instructive and interesting nature. The name of Mr. Hannaford will be recognized as that of one of our most generous and talented amateurs. Not to be tedious, I will briefly add that in Messrs. Statham, Ackland, Shadbolt, Noldwritt, and others, we have the necessary scientific elements ; that in Messrs. Leake, sen., Leake, jun., Hook, Hughes, Cotton, Howard, Clarke, Hervé, Chapel, Ackland, Shadbolt, and others, we have practical photographers of no mean ability; that in some of the gentlemen already named we have excellent mechanics: and that in Messers. Hervé, Keens, sen., Hannaford, Rogers, and others, we have artists of professional repute or amateur skill. As to the Secretary, we have in him a very "willing horse;" but, I fear, one not sufficiently competent in branches of knowledge more practically photographic, as I stated previous to election. But now, gentlemen, having told you what we have, and with good cause congratulated you upon the same, I wish to conclude with a few words upon what we have not. Although we have as many members as, or more than we could reasonably expect, we have not enough. Members represent money, which, however vulgar in a speech, is no less the sinews of art and science than of war. How to increase our members, and consequently our money, is therefore a question of primary importance. There are of course many means for this end; but there is one which I more particularly desire to point out; and that is by the formation of a circulating library of stereoscopic and other photographs for the benefit of members. This we may very speedily obtain, if such of our members as possess negatives will generously present their Society with positives from them, and also appeal for the same to their photographic friends in the name of a Society devoted to the advancement of photographic art and science, which in common with all other similar institutions has a just claim upon their kindly sympathy and support. By doing this we should offer attractions for those who, without being practical photographers, would be glad to secure such an advantage; and the increase of the Society's funds would enable your committee to organize and bring about fresh advantages for present members, and consequently new inducements for non-members. It is hardly necessary to state that, as Secretary, I shall very gratefully acknowledge any such contributions, from whatever quarter they may arrive, as also any letters relative to the exhibition of pictures, apparatus, &c., the reading of papers, or names for nomination and election at our meetings.

The President having seconded Mr. Wall's appeal for the folio, and called attention to other subjects connected with the Society,

Mr. H. L. Keens, sen., was then called upon to read a paper entitled "Truth in Art illustrated by Photography."

After duly defining his strict meaning in the use of such terms as "Truth in Art," "Nature," "præ-Raphaelism," and "Photography," Mr. Keens said:—

In a court of law we are required to speak "the truth, the whole truth, and nothing but the truth;" so also in the art of painting is the same quality in all its bearings rigidly required. I will therefore direct your particular attention to this point, while we endeavour to elucidate it.

Suppose, by way of example, that an artist, passing through the streets of our densely-populated city, has his attention arrested by the sight of a decrepit old man, apparently sick, and suffering acutely from hunger and neglect, while endeavouring by the aid of a stick to drag his wasted form to a place of public observation, in the fond hope that some merciful creature may relieve him. A young and beautiful lady, who has just stepped from the door of her home in a more public thoroughfare, having her eye attracted and her heart touched by so much accumulated misery, stops,

and hastens to succour him. Now the artist who can by a few simple materials develope on his canvas a faithful representation of this interesting scene in all its truthfulness, would be deservedly worthy of our warmest gratitude. We should not be satisfied to see the beggar represented with a fine fresh complexion, white linen, and smooth hair: no, it must be truthful. We must see him there with his dirty sallow skin, his hollow sunken eye, grisly beard, and ragged clothes—in short, with all that which naturally excited the compassion of the young lady. Her dress also, whether silk or satin, must be faithfully depicted with no less care than is her graceful form and beauteous face; but, above all, the angel of compassion must speak from her melting eye, her expressive lip, and glowing complexion. This will serve to illustrate my view of truth in Art. Let us now proceed to the subject of præ-Raphaelism.

The pictures painted some centuries previous to Raphael were generally religious, executed either for churches or private oratories; the subjects were generally single figures representing our Lord, the Apostles, or some of their successors who had signalized themselves in ecclesiastical history. In most of these subjects there have been more or less of the traditional types which all artists copied: thus, for instance, the representations of St. Peter and St. Paul used even now, correspond with the description given by the historian Eusebius. In order to convey the religious feeling which the artists themselves were in possession of, they had recourse to the study of that general placidity and composure which were more or less stamped on the countenances of the ascetic and recluse of their times; consequently, so far as regards the expression of the countenance, their productions were truthful, but in every other respect they were strangely untruthful.

But there were artists occasionally starting up from their fellows, and aiming at some near resemblance to Nature, thinking that Art was not advancing to its true goal while nothing was attempted beyond the representation, or rather communication, of some thought, which, although in itself grand, pathetic, or beautiful, was but imperfectly conveyed.

As the technicalities of painting became more understood, they saw with pain and dissatisfaction that the solemnity of the subject was defeated or destroyed by shocking departures from the realities of nature, as in some pictures by Fra Angelica, in which the heads are worthy the study of a modern master, but the bodies of the same figures excite the ridicule of the youngest tyro in the Academy.

Nature then became the entire and exclusive study of the artists; and, although it is to be lamented that the mind was so exclusively directed to a close imitation of the object as sometimes to commit itself to objects unworty of the pencil, while the noble and instructive subjects of history or religion were laid aside, still it is satisfactory to know that on the walls of the Vatican, Raphael pourtrayed forms and expressions (with some degree of excellence in colour and chiaros curo) which satisfy the most critical, and speak to the heart and understanding of millions of the unlettered more powerfully and more effectually than the most eloquent oration, while affording to the learned subject of reflection, and adding a new charm on every fresh inspection—like the oft-read poem, ever living, ever new. *And thus did truth in Art extinguish præ-Raphaelism.*

Now let us imagine a traveller, who on entering a forest finds several pathways before him: he feels utterly at a loss to know which will lead him to his place of destination, and has good reason to fear the terrible danger attendant on the approaching night; a Will-with-a-wisp has just risen, and will assuredly lead him astray into some marsh or bog, as no friend is near to direct his steps. Such was the position of the human mind in this country with regard to Art not many years ago, uncertain what course of study to pursue,—whether nature should be imitated, or the conventionalisms of fashion and fancy. One class of artists proposed the study of the antique; another that termed the ideal; a third the undiscriminating imitation of nature; while others chose a close adherence to this or that favourite master of some peculiar school or age. So unsettled was the mind of some patrons, owing to the conflicting styles and theories, that (as I know from my own experience) many artists lost their commissions or employment. Præ-Raphaelism was the Will-with-a-wisp that had led them astray. Misleading Art produced Art-critics and Art-patrons, until, like an angel from heaven to the benighted traveller, *Photography appeared* and, with a soft whisper, pointed out the path which would lead us to that perfection in Art which we all desire. To show this will be our object in the remaining portion of this paper.

We shall consider it under three points of view:—first, as to outline; secondly, as to light and shade; thirdly, as to texture.

First, as to outline. The outlines in a good photograph are so true that they will alone convey the most striking likeness of a face, with the precise expression of the sitter: let an artist take a very light photographic print,

and strengthen the outlines only; he will be surprised at the result. How many artists, attempting to draw a face in outline, and finding themselves unequal to the task, have thrown aside the crayon and taken up the brush, hoping to succeed with shade and colour, and thus produced, in too many instances, an amalgamation of errors, which but scarcely pleased the ignorant, and greatly disgusted the more informed! Observe the outlines in photographed cloth drapery: how elegantly each line curves! no disagreeable angles, no formal stiffness; all is ease and freedom: in the foreshortenings the folds appear multiplied; but although pressing upon each other, every line is clear, nothing confused; each division and intersection is worthy of study and imitation. In silk we see the crispness of the material breaking the lines by repeated cross-cuttings and intersections; yet, notwithstanding, every break is but an introduction to smaller curves equally beautiful. Velvet is peculiarly worthy of our attention; the weight of the fabric and the softness of the surface give occasion for the most elegant lines in great variety. As I have said, let the most cultivated and best-informed artists pass over the outlines of a photograph so as to produce a picture in outline only; they will certainly be delighted with the result, and their minds be so settled with regard to style that all those stiff and mannered forms called præ-Raphaelite must be driven from the walls of our exhibitions, like horrid witches flying at the approach of innocence and truthfulness.

Light and shade (or, as artists term it, chiaroscuro) may be seen to perfection in a good photograph, whether we refer to its parts or to the whole. Observe, for instance, the shadow under the nose; it is not an opaque patch of black, but an imperceptible gradation from the deep markings of the nostrils to the half tones in which it becomes lost. [Some beautiful specimens of portraiture were here handed round by way of illustration, showing the powerful effect of reflected light below the brows, chin, nose, shadowed side of the face, &c.] Observe, again, the gentle gradation by which high lights glide into the half tints, and these again into the shade, until all is lost in its deepest recesses, and that so imperceptibly that there actually appear to be no shadows, although all is in full relief.

The old masters were delighted to study Nature as reflected in a mirror, and learn thereby to imitate its mimicry; but could they have seen a photograph, an image fixed, that could be analysed, examined, and studied at ease, not like that in the mirror, fleeting and changeful as Nature herself, would they not have rejoiced and been as delighted to profit by such invaluable suggestions as by that of the mirror?

The careful truth of their imitation is apparent in the productions of Corregio, Rembrandt, Teniers, and Rubens. They give us such magical effects of light and shade, that the chiaroscuro itself awes us into a more careful examination of their glorious works; but how different is the effect of those disagreeable patches of crude light and colour which under the name of pictures have so frequently disgraced the walls of our exhibitions, in which the various objects appear to be cut out of pasteboard and pasted on the canvas, not unlike some of those old drawings occasionally to be met with, representing playing cards laid flat and partially covering each other! No wonder that foreigners should have smiled with contemptuous surprise at such foolish productions.

How beautiful, again, are photographic landscapes! There is no mistaking distance in these, although unaided by atmospheric colour. Each tree in an avenue recedes from the nearer one; first, second, and third distances keep their respective places, until the extreme distance is lost in atmosphere; while the detail of the foreground is wondrous with leaf, moss, bark, &c. in perfection. Unlike the morbid productions of the new school of painters, no distant hill or cloud is here seen attaching itself to the head of some miserable figure in the foreground, as in the former pictures have of late been so frequently seen.

I intended to conclude with a few words upon texture; but it is really superfluous. Examine the photographs before us: all is perfection—flesh, hair, silk, satin, velvet, cloth, lace; in a word, the exact texture of every object in Nature. Nay, it *is* Nature, Nature itself; and

> "Who can paint like Nature?
> Can imagination boast such varied hues?
> And can she mix and blend them with such skill?"

At the conclusion of Mr. Keens's paper (which was received with expressions of applause), the PRESIDENT remarked that beyond a doubt the cause of Art had been efficiently served by the introduction of Photography, and that the spirit of improvement traceable in the productions of modern art was justly due to its influence, although the fact was not, perhaps, fully acknowledged just now. There were too many artists who still held the pernicious doctrine that it was their high mission, not to copy, but *improve* upon Nature, and had done more to lower and degrade their calling than could be briefly calculated. But that such was not the opinion of the great masters could be easily proved. For instance, among Raphael's celebrated drawings at Oxford, which when

there he frequently and carefully studied, was a picture of the three Magi, into which an elephant had been introduced; and he found that before Raphael painted that animal, he made at least twenty careful drawings of it in various positions,—not mere sketches, but finished productions, full of laboriously executed details; even the peculiar bosses and wrinkes of the skin, and creases upon the trunk, were scrupulously copied. If Photography re-created this spirit of industry and patient care, and called modern art back to this *Raphaelism*, it would, he inferred, speedily extinguish the school called PRÆ-*Raphaelite*.

Mr. WALL thought the picture of the charitable girl and the beggar not only defined Mr. Keens's idea of "Truth in Art," but also its advantages. In a painting of this incident, without doubt, "the whole truth, and nothing but the truth," would best serve the highest aim of morality and religion, and consequently secure to the artist the highest and most valuable reward of his art. There was nothing in the beggar to awaken interest in the breast of a romantic girl; he was dirty and repulsive; and therefore it was the pure, holy and Christian feeling of charity alone which moved the young girl's melting heart, and prompted her outstretched hand. He (Mr. Wall) also agreed with the author of the paper in thinking that perfection of detail could in no way detract from the high purpose of such a picture; for, however truthful, and consequently beautiful, the imitation of silk or satin drapery might be, he should not envy the mind or heart of a spectator who found such things more attractive than that sweet expression emanating from the angel of compassion—an expression which was more frequently than any other seen upon the divine face of the great Saviour of mankind. In such a scene an artist would find every quality he required—contrast, sentiment, loftiness of purpose, &c.,—and the photographer nothing beyond the capabilities of his camera, if it were only possible by the pistol or some other such arrangement to obtain a picture without the cognizance of the principal actors. He would only add a few words, to say that while we decry bad painters as infinitely below the standard of photography, it should be remembered that we *sometimes* see bad photographs as far below that of bad pictures. [The speaker then concluded with some few remarks relative to the advantages photographers possess in the existence of societies for the advancement of their art.]

Mr. KEENS said the Chairman's remarks reminded him of some observations made to himself by an Italian artist painting at Hampton Court, who pointed out to him the extreme accuracy of detail presented by the cartoons, even in the representation of the fingers, the muscles of which were in their action almost as eloquent of the varied feelings as those of the faces,—the upraised hand of the preacher in the 'St. Paul Preaching' contrasting finely with the almost paralyzed appearance indicated by the drawing of the muscles in the hands, arms, &c. of the intently listening figures around.

Mr. LEAKE, jun., then read the following paper, entitled "Practical Hints upon Positive Printing," prefacing the same by remarking that, as it was intended solely for beginners, the gentlemen present must not expect an elaborate paper upon the theory of positive printing. He merely intended to offer a few hints which he thought might be useful at a time like the present, when most amateurs, having returned from their photographic tours loaded with negatives, were anxiously considering how they might produce from them the best positive prints. To assist them in the accomplishment of their purpose, he proffered the results of his own practical experience in the following words:—

I think that to produce good and permanent prints will put all the good qualities of the operator to the test; and, consequently, the notion that to print a positive is "the easiest thing in the world" had better be at once scouted, and the idea that it will require all the care and skill of which the operator is master be substituted in its place.

I shall first notice the paper. I always use Saxony, if procurable; if not, I prefer Canson's. I like it of medium thickness, as I find, if too thin, the prints are deficient in vigour, and if too thick, it is, when albuminized, very difficult to tone. As a rule, the thick will give the richest print. I suppose nearly all the amateurs procure their paper ready albuminized; and this is the best and cheapest plan if a small quantity be required, the only precaution necessary being to procure it of a good maker, as an inferior paper is "dear at any price," leading as it does only to disappointment and disgust.

We must next notice the albuminizing and salting. Enough albumen should be used to give a fair gloss; but it must be borne in mind that it is not used merely to give a glaze, but to impart a vigour and a richness to the prints which cannot be obtained by any other means. I think too much albumen gives an amount of gloss which destroys the artistic effect of the proof, and, no doubt, retards the toning to a great degree; if, however, it can be toned without sulphuration, the resulting pictures will be of a very rich, deep tone. If, on the

other hand, too small a quantity be used, the pictures will tone more rapidly, but will be wanting in richness and depth, and will approach in effect prints on plain paper.

In selecting a sample of albuminized paper, it will be remembered that it is not always that with the most glossy surface which will contain the most albumen or give the finest results, as some varieties are glazed by hot-pressing or some other method: this will soon show itself, as in the sensitizing and subsequent processes it will lose most of its surface. I prefer a paper with enough pure albumen to give a nice, even surface without being too highly glazed. Owing to the differences in the sizing, &c. of various papers, the proportions necessary for this result can be determined only by experiment. As regards the salting when albumen is used, a less quantity will be required in solution than will be needed for plain paper, as the albumen will retain more of it on the surface. The quality and tone of the print is materially affected by the proportion of salt, a highly-salted paper giving, with a proportionate quantity of silver in the sensitizing bath, a richer and more brilliant print than one slightly salted. As I have not prepared any great quantity of albuminized paper myself, I cannot give any positive rules or formula for the process, but must refer the amateur to one of the many works treating of this subject. Albuminized paper *cannot be used too fresh.* I have no doubt that much of the trouble and disappointment met with in positive printing is owing to the decomposition of the albumen. I once had a quantity of paper handed over for my use, which, when laid on the silver bath for sensitizing, left the albumen and salt floating in the solution,—a disagreeable peculiarity which I found attributable to this cause only, the same bath giving perfect results with a fresh sample of paper of the same make. I think it a good plan to dry the paper gently at a distance from the fire (if it seems at all damp, or if it be damp weather) immediately before placing it on the sensitizing bath. We shall now notice the sensitizing process. Albumen paper should always be sensitized by floating. A grain solution is generally considered to be of sufficient strength, and, no doubt, is for some qualities of paper, while for others a much stronger bath will be necessary. Of course this will have to be regulated by, and adjusted to, the quantity of salt retained by the albumen; and it is much to be regretted that the manufacturers of albuminized paper do not specify as a rule the amount of salt used in its preparation. As the negatives from which I print are generally portraits, very soft without great intensity, I prefer a bath of from 80 to 100 grains; this will give a very fine toned proof. At any rate, the amount of nitrate should not be allowed to fall below 60 grains, except to print from a very hard negative.

It must be remembered that the colour of the prints is to a great extent affected by this cause,—a weak bath giving a cold and faded appearance, while prints from a bath of full strength will, if from a good negative, be of a fine, deep, rich and warm tone.

You need not be afraid of having the silver bath too strong, as it will diminish rapidly by use, and will take a very large excess to spoil a print, though a slight deficiency will do so most effectually.

Some operators recommend the addition of a small quantity of acetic acid to the sensitizing bath; I consider this a most doubtful proceeding; in fact (it may be mere prejudice, but) I do not like acid in any part of the printing process, and always avoid it if possible. If the bath become alkaline by use, which may be known by its removing the albumen, enough acid should be added to neutralize, but not to acidify it. I generally keep a little kaolin at the bottom of the bottle in which the bath is kept; this keeps it of a nice colour, and it *looks* cleaner if it is not. From three to five minutes will generally be found sufficiently long for the floating. I think it should not be allowed a much longer time, as the solution penetrates the albumen, and is absorbed by the paper, which it rapidly discolours. The paper should not be sensitized long before use, if the finest results are desired, as it becomes yellow, and the prints look cold when toned. I sensitize my paper the morning I intend to use it, dry it gently at some distance from the fire, and place it in a folio between clean blotting-paper for use.

The only precaution necessary in the exposure to light is to keep the paper in close contact with the negative. It will be found that most negatives print better in the shade than in the direct rays of the sun; but I think a little depth is sometimes gained by a short exposure to sun-light by way of finish; this, however, is mere supposition, and I give it for what it is worth.

We now come to the most critical and difficult part of the process, the fixing and toning: to perform this operation properly, will require a great deal of care. The primary object most photographers seem to have in view is to produce *black tones*: black they will have by hook or by crook, and, unfortunately, whether obtained by *sulphur* or *gold*.

The toning-bath I would recommend for general use is the old one for toning and fixing

in one operation, the formula for which is so well known that I need not repeat it, but will merely remark that very exact proportions are not essential. I have tried most of the new baths, but, although some of them give very excellent results, I think quite as good may be obtained, *with more certainty* and less trouble, by the old one. Upon removal from the printing-frame, the proof should be washed in common water till it ceases to flow milky, in order to remove the free nitrate. I consider this important, *if permanence be desired*, for two reasons: in the first place it prevents that sulphuretting process which is invariably set up on the addition of nitrate of silver to the hyposulphite bath; and in the second, it gives the alarm when the supply of gold falls short, as the prints will then tone with great difficulty and slowness. The utmost care should be taken to prevent acidity of the bath, which may arise from various causes. In hot weather it will often become acid spontaneously, but more often from the chloride of gold containing free hydrochloric acid. To prevent, as much as possible, inconvenience from this cause, I use two toning baths, on alternate days, and immediately after use replace the gold I consider to have been abstracted by the prints toned. By this method forty-eight hours are allowed to elapse between adding the gold and using the bath, thus giving time for the deposition of the sulphur, and consequent neutralization of the bath. Some operators actually recommend the addition of a small quantity of acid to the toning bath. When this is done the bath assumes a milky appearance, and the prints, being immersed in it, pass rapidly to a very dark tone, though in all probability they are sulphuretted to a very high degree, and consequently are *not permanent*. To remove any acidity which may arise, I use a trace of ammonia; or, if preferred, a little chalk may be kept at the bottom of the bottle in which the bath is. The exact quantity of gold used has not, I believe, been accurately determined; but I do not think more than two prints 10×8 can be properly toned by each grain; and if very fine tones be desired, a larger quantity may be used.

To keep up the fixing power of the bath, I retain a few crystals of hyposulphite at the bottom of the bottle. If this be done, no further fixing of the proof will be required. It is better not to use a toning bath too long, as it will, notwithstanding every precaution, acquire toning properties even in the absence of gold, and the accumulation of organic matter will render its use dangerous. I would recommend that the toning process be conducted as soon after exposure as possible, for the paper will rapidly discolour; if, however, the prints are placed in a dish of clean water, they will keep some time without receiving much injury.

In toning albuminized prints it should be remembered that the natural colour of the photographic image *on albumen* is pale red, and that in consequence it will require a more energetic toning bath to produce a black tone *on it* than on plain salted paper; and also that a very prolonged immersion in the bath is favourable to sulphuration—yellowness of the whites and subsequent fading. I therefore think it preferable to be contented with the really beautiful tint obtainable by this process before the black tones are reached, rather than obtain the black tones and endanger their permanence. When removed from the toning bath, the proof should be well rinsed in cold water, *frequently*, as it is essential to remove every trace of the hypo *as quickly and thoroughly* as possible. To effect this, the prints should be placed in a dish of water and turned over several times, the water then poured away, a fresh supply added, and the process repeated. They may then be placed in a large vessel, and a stream of water allowed to pass through them for some hours, the water being repeatedly poured *entirely* off. It will not be enough to turn on the water and leave the prints to take care of themselves, but they must be frequently turned over and separated so as to ensure *each picture* a thorough washing. A prolonged soaking is, I consider, quite unnecessary, from twelve to sixteen hours being amply sufficient. Some operators recommend washing in hot water by way of finish; but if the care I have advised be taken, this will not be required. When properly washed, the proof may be dried at a moderate distance from the fire, ironed between blotting-paper, and then mounted: for this purpose I use a very strong solution of gum, taking care that it is freshly mixed. Hot-pressing will greatly improve the prints; and as this may be done very cheaply, I would advise finishing with this process, and recommend it for general adoption.

To recapitulate: I consider that, in order to produce the best results by this method of positive printing, the following conditions are necessary:—The paper should be of moderate thickness, and retain a fair proportion of albumen and salt on its surface; the exciting bath neutral and of full strength; the free nitrate should be removed before immersion in the toning bath, and the toning itself preserved neutral, with the supply of gold well maintained. The proofs should be well rinsed immediately on removal from the toning bath, and the operations of sensitizing, exposing, and toning performed, if possible, on the same day.

Several very beautiful specimens of photographic portraiture were handed round as Mr. Leake's productions by the process he had described.

Thanks having been voted to Mr. Leake for his able and eminently practical paper,

The CHAIRMAN hoped to hear some remarks from the practical photographers before him. He would take that opportunity of impressing upon the gentlemen present the importance of carefully observing anything unusual or accidental which might occur in their photographic practice. It was his belief that no science or art was so much indebted to accident for its discoveries and improvements as photography was. If every gentleman in whose experience a fact transpired for which he could not account would make a note of the same and bring it forward at these meetings, he had no doubt that they would form a most curious and interesting collection, and lead, by discussion, to very valuable experiments and results.

Mr. HANNAFORD thought the subject of positive printing was a matter of vital importance, and that hints upon such a subject deserved their best thanks. In looking over our prints, we all found a greater or smaller per-centage of them faded; but whether or not photographs toned by the alkaline gold process would prove more uniformly permanent than those by the old process advocated by Mr. Leake must be left for time to decide; as, however, we were sure that the whole toning came from gold, and not from sulphur, and as the prints remained but a short time in the fixing solution, it appeared to him that the advantages were decidedly in favour of the alkaline toning bath. He had tried Maxwell Lyte's process with the phosphate of soda, with great success. Recently he had employed acetate of soda with the gold. The advantage gained by it was, that over-exposed prints could be toned down very considerably, and, on the addition of a small quantity of carbonate of soda, the prints would continue to darken with but little further reduction. He had made a great number of experiments in printing, with the salts of various metals—iron, copper, cobalt, &c. [and he exhibited a few specimens in iron]. His only difficulty was in procuring pure whites. He was at present of opinion that none of these new processes stood any chance of superseding the use of silver; but they formed subjects for very interesting experiments, which probably might lead to some useful results. He hoped at a future time to read a paper upon this subject.

Mr. HOWARD stated that he must certainly agree with Mr. Hannaford in regard to the alkaline chloride of gold bath, as he had met with a deal of trouble by using the toning bath advocated by Mr. Leake, in the discoloration of his prints, which fact induced him to cease using it; since doing which he had never had any symptoms of fading, the whites being always good and pure. In the hands of professional printers, no doubt, good results were obtained by Mr. Leake's process; but he thought amateurs would derive greater satisfaction from the use of the other bath. He regretted that he was not chemist enough to advance any stronger arguments.

Mr. HUGHES thought the old bath theoretically defective. We could not say whether the tones obtained by it were due to gold or to sulphur; but in using the alkaline bath we were at least sure that sulphur had nothing to do with the toning. By its use we could also obtain any colour we desired, from a chestnut-brown through the purple-browns into a violet-black, or, if such was by any chance desirable, into a cold inky black. With regard to its economy, in contrast with Mr. Leake's calculation, he had, by experiment, ascertained that 1 grain of gold would tone 500 square inches of albuminized paper.

Some prints were examined, the peculiar yellow patches and mottled appearance of which were traced by Mr. Hughes to the use of too weak a solution of the hyposulphite.

The CHAIRMAN then announced a paper on "The Difficulties of the Dry Processes," by Mr. W. Ackland, for the next Meeting, on Thursday, November 17th. Mr. Hannaford also promised a paper upon "Photographic Jottings;" and the Secretary said he hoped to collect for the same evening an interesting exhibition of photographs: he also touched upon the advisability of reopening the discussion just terminated, as much remained to be said upon both sides.

The following gentlemen were then proposed as Members, and elected:—Messrs. Stevens, Armstrong, Luckin, Hughes, Hook, Ottley, Stevens, Wood, Chapel, and Keens; and the business terminated with a cordial vote of thanks to the Chairman.

Blackheath Photographic Society.

To the Editor of the Photographic Journal.

November 5th, 1859.

SIR,—We should not have noticed Mr. Burnett's letter, published in your Number for October 15, did it not contain some statements the accuracy of which we might be supposed to admit if we left them uncontradicted. We must therefore trouble you with a few words in reply.

It is a matter of perfect indifference to us,

whether or not Mr. Burnett believe our assertion that we did not mean to credit M. Nièpce with introducing Uranium as a photographic agent; but we altogether deny that the words "The Uranium printing process founded on these (M. Nièpce's) experiments, promises to become of some importance" necessarily *imply*, much less "explicitly state," anything of the kind; and we again say, they referred only to the particular process by which the pictures were produced, which, at the time our report was written, were being handed about at various scientific societies in London, and exciting much attention.

We have already stated that we were not aware at that time of the identity of this process with one previously published by Mr. Burnett, and have expressed our regret that we had thus unintentionally wronged him.

Our attention was first drawn to Mr. Burnett's claims by an editorial remark of Mr. Shadbolt's, *in the same number of his Journal in which the report was published, and after* its appearance in another Journal—not before, as Mr. Burnett insinuates. The delay in replying to this remark, of which Mr. Burnett complains, was fully explained in our letter to Mr. Shadbolt, published in his Journal, which Mr. Burnett has altogether ignored while referring to a private correspondence between our Secretary and Mr. Shadbolt, for which of course we are in no way responsible.

JAMES GLAISHER,
On behalf of the Council of the Blackheath Photographic Society.

The Archer Testimonial Fund.

To the Editor of the Photographic Journal.

"Bis dat qui citò dat."—*Eton Lat. Grammar.*

SIR,—I was too far from the Secretary at the last Meeting of the London Photographic Society to hear the whole of the letter suggesting that an annual subscription should be raised for the education and general maintenance of the children of the late Mr. Scott Archer; but the purport of the letter appeared to be that every photographer should subscribe 1*l.* 1*s.* or 10*s.* 6*d.* annually for eight or ten years. This proposition does the author of it very great credit, more especially as a sevenfold proportion would fall on his own shoulders; but it seems to me that it is open to several very serious objections. Every one who has been at all connected with charitable institutions will bear me out in saying that it is a most difficult and arduous task to maintain even the smallest annual subscription beyond two or three years. The amount of hunting up and worrying necessary in such cases is almost incredible. The difficulties of collection too, year after year, would be very great. The country-town photographers are very nomadic in their habits, generally wandering about from town to town. Even in our own city how many establishments have ceased to exist within the last few years, how many have changed hands, and how many of our first-rate men have been taken away from amongst us by death! I fear much, that after a couple of years the poor collector on going his rounds would find that Mr. A was out, that B had sold his business to C, who did not care to subscribe, that D had gone to South America to photograph the ruins of the city of Popocatepetl, and so on to Y, who had gone on an African exploring expedition, and Z, who had gone to America for the benefit of his health, having burnt his fingers in trying the ink process on paper embossed by Her Majesty's Stamp Office.

Then, again, we are to have Louis Napoleon for our ruler next year or the year after; and he will to a certainty interdict the art of photography, as being much too truthtelling for his enlightened government. Who knows, either, whether the collodion process may not shortly be superseded by a new and more perfect process, as itself superseded the daguerreotype? Possibly a raspberry-jam, lemonade, or milk-and-water process (as it is the fashion now-a-days to seek for new photographic materials in the kitchen instead of the laboratory) will be the grand photographic climax! But, to speak seriously on this really serious subject, it is much more for past than for future benefits that we are in justice indebted to Mr. Scott Archer; and the plan of an annual subscription does not seem to me the way towards endeavouring to cancel the debt.

The proposal I have to make is this—that the various photographic houses in the United Kingdom should follow the example set by numberless City firms at the time of the Patriotic Fund and the Indian Mutiny subscription, and set by one day's receipts. Let all the operators and assistants follow the example of the City clerks, and contribute one day's pay towards the fund. This being the worst time of the year, the day would have to be fixed some three or four months hence. In the meantime let the public know that the receipts of that particular day are set apart for a charitable purpose, and perhaps they who are so assiduous in dining, dancing, concert-frequenting, &c. &c., playing at shop in pleasant parks for benevolent objects, will also have their portraits taken for charity's sake.

Perhaps it will be objected that photogra-

phers will not like to have their daily receipts known to the public. Well and good—perhaps they may not; but that difficulty is easily obviated by the particular amounts being communicated to the Archer Fund Committee *only*, the Secretary giving each firm a receipt for their contribution, and simply publishing the names of the firms, with the total amount contributed. The tardy way in which the few hundreds already subscribed have been collected is a disgrace to the photographic profession. Let us all join heart, hand, and purse to wipe away the stain on our character.

The importance of the subject is too great to render it necessary for me to apologize for taking up so much of your valuable space.

LONDON PHOTOGRAPHER.

To the Editor of the Photographic Journal.

2 Featherstone Buildings, Holborn.

SIR,—The suggestion made in your last Number by "P. P., jun.," to the Committee of the Archer Testimonial Fund, to the effect that "one, two or three names of respectable tradesmen, dealers in photographic apparatus, in each town, be obtained, and there be issued to them a book with an authority to collect subscriptions," is just the thing, if carried out with spirit, to considerably augment the fund. I for one would be happy to assist in carrying out the subscription project, and to head with ten guineas a list which I shall be proud to see on my counter.

Permit me to suggest, further, that subscribers to our next Annual Exhibition place in the room for sale, at moderate prices, duplicates of their subjects, and devote the proceeds to the object in question. Similar arrangements might also be carried out in the principal towns in the country, where I have no doubt the same enthusiastic love of the art exists.

It must be acknowledged that the photographic world have in this case a moral duty to perform; therefore an effort should be made to place the orphans in a position which may enable them eventually to overcome the difficulties with which they have to contend.

THOMAS ROSS.

CONTRIBUTIONS RECEIVED.

	£	s.	d.
Mr. W. Britton	1	1	0
C. Johnson Taylor, Esq., St. John's College, Oxford	2	2	0
Mr. Goddard (2nd sub.)	0	10	0
Percy Standish, Esq.	1	1	0
Mr. Alfred Keene, Leamington	1	1	0

Mr. HARDWICH *on Spontaneous Decomposition of Pyroxyline and Collodion.*

THOSE chemists to whose labours we are indebted for our knowledge of the substitution-compound pyroxyline, were not all of them aware that the stability of this substance is uncertain even at common temperatures. It has been asserted on good authority that, if the conditions of dryness and neutrality be observed, the material is permanent in air not heated higher than 100° Fahrenheit.

This statement, however, is opposed to the experience of those who use pyroxyline for photographic purposes. The following are instances of spontaneous decomposition:—

An amateur manufacturer of collodion purchased some pyroxyline with the intention of taking it abroad, but his departure being delayed beyond the time originally intended, the pyroxyline was left in a bottle upon the shelf. After a time he was surprised to observe that it appeared to be liquefying down into a gummy substance, and the bottle was therefore cleared out, and a sample from a different maker introduced. This second sample was of that kind which previous observation had shown to be comparatively stable, viz. firm and unbroken in structure, yielding a contractile film in collodion. Nevertheless it eventually shared the fate of its predecessor and began to evolve red fumes.

In another case a specimen of pyroxyline in a bottle showed signs of incipient change, and for experiment sake a little water was introduced. In this water, curiously enough, the pyroxyline at once dissolved, leaving fragments in suspension.

Practical men say that the stability of pyroxyline depends very much upon the perfection of the washing process: but the question arises, whether we must not look beyond this in some instances? In eight cases of decomposition of pyroxyline reported, there is reason to think that the washing was properly done in at least *four*, and of the others nothing can be said either for or against. Absence of humidity would suggest itself at once as an important condition for keeping; but there is also another, which has occurred to the writer. Has the action of *light* anything to do with the spontaneous decomposition of pyroxyline? Inquiry elicited the fact, that in each of the eight cases to which allusion has been made, the materials had not been kept in the dark, but simply placed upon a shelf exposed to diffused daylight. Some pains had indeed been taken with the two samples which were intended for exportation; for, as their owner observed, "he had previously kept his pyroxyline

wrapped up in brown paper, and it did very well; but this time, thinking to be especially careful, he put it away in a wide-mouthed bottle. As to any effect produced by light, he did not anticipate injury from such a source."

Red vapours in the upper part of the bottle are a sure sign of spontaneous change; and the extent to which this liberation of oxides of nitrogen may take place was evidenced in the examination of a crop of needle-like crystals which had been found adhering to the bottom of a bottle containing iodized collodion. Bearing in mind a discussion at our Society's meeting some time during the last Session, we expected to find oxalate; but in this case no oxalate was present, the crystals consisting simply of *nitrite of potash*.

The decomposing effect of light, suspected only in the case of pyroxyline, is certain in that of collodion. Nevertheless there are many consumers of collodion who have a very imperfect idea of this fact, and do not know that harm will result excepting from a long exposure to the sun's rays. We can assert, without fear of contradiction, that a fortnight on the laboratory shelf, opposite to the window, may seriously deteriorate a collodion prepared from pyroxyline made out of old cambric handkerchiefs; and in any case, if it be desired to maintain for several months that state in which the fluid remains nearly colourless on the addition of iodide of potassium, absolute darkness is essential.

On conversing with photographic artists, one finds that many of them are misled by appearances due to a peculiarity in the spirits now often employed for collodion—*id est, methylated* spirits. The methylated alcohol will always absorb a portion of iodine, and especially so in presence of a bromide. Now, as decomposition of collodion is detected by liberation of iodine, it is quite necessary to note the error which is introduced by the presence of a body capable of reabsorbing iodine, because we know that collodion which is kept in the pale state merely by methylated spirit, is not more sensitive than it would be if the iodine were allowed to remain. This statement has been contradicted, but the writer believes it to be true, and therefore advises that pains should be taken in preserving the collodion from those injurious conditions of heat, and especially of *light*, which are known to affect it.

On Albumine and its Compounds.

To the Editor of the Photographic Journal.

Sir,—An interesting discussion on the above subject, principally with reference to the Fothergill process, occupied some pages of the Journal not long since; and the question does not seem to have had as yet any satisfactory settlement. It is with the hope of adding something towards a better understanding of the subject, that I beg leave to contribute a mite of information gained from other sources, during the intermitted studies of many months past and a great many practical experiments.

It is unfortunate for us, that of late the investigation of organic compounds has been pushed more successfully by French and German chemists than by our own; and if the student would keep *au courant* with the progress which is daily making in this branch, he must rather seek for information from foreign authors than expect to find it in our standard works. Lieberkuhn, Wurtz, Hruschauer, Scherer, Lehmann, Lassaigne, and Gerhardt have done much for the chemistry of albumine; and if there is anything interesting in the following communication, it is derived from these sources.

The researches of Wurtz and Hruschauer have proved that pure albumine is not only acid in its reaction on litmus-paper, but that it is in other respects analogous in its characteristics with the acids, many of which it displaces from their bases in the salts, and by many of which it is likewise displaced from its combinations, and coagulated, and in some cases redissolved, by an excess of an acid or of a salt.

Lassaigne states that pure albumine is a weak acid, and that its combinations with the alkalis may be obtained either by means of the caustic alkalis or their combinations, and that other combinations with the metallic salts may be obtained by means of the alkaline albuminates.

It is thus suggestable whether or not this substance may not be termed with propriety albuminic acid.

Lieberkuhn has determined its formula as follows:—

$$C^{144} H^{112} N^{18} S^2 O^{44}.$$

It will be remarked that the element phosphorus is absent from this formula, the reason assigned being that phosphorus is not in all cases found, and its presence is thus considered as accidental.

Lehmann, confirming and adopting the formula of Lieberkuhn, has given the combinations of albumine with certain bases in the following formulæ:—

Albuminate of Potass—

$$C^{144} H^{110} K^2 N^{18} S^2 O^{44} + 2Aq.$$

Albuminate of Soda (*acid*, 7 eq. HO)—

$$C^{144} H^{111} Na N^{18} S^2 O^{44} + 2Aq.$$

Albuminate of Soda (*neutral*, 2 eq. Aq)—
$C^{144} H^{110} Na^{2} N^{18} S^{2} O^{44} + 2 Aq$ (?).

Albuminate of Baryta—
$C^{144} H^{113} Ba N^{18} S^{2} O^{44} + 2 Aq$ (?).

Albuminate of Zinc—
$C^{144} H^{110} Zn^{2} N^{18} S^{2} O^{44} + 2 Aq$ (?).

Albuminate of Copper—
$C^{144} H^{110} Cu^{2} N^{18} S^{2} O^{44} + 2 Aq$ (?).

Albuminate of Silver—
$C^{144} H^{111} Ag N^{18} S^{2} O^{44} + 2 Aq$.

I give these formulæ precisely as they are quoted by Gerhardt, I must confess, without clearly understanding their peculiar arrangement, which appears to have some reference to molecular disposition. Taking, for instance, the formula for albuminate of silver, it would perhaps be more consistent with our system to express it as follows:—

$$Ag O, C^{144} H^{111} N^{18} S^{2} O^{43} + 2 Aq.$$

The principal constituent of white of egg is determined by the same authorities to consist of albuminate of soda in solution, accompanied by more or less of the soda-salts and phosphate of lime; and this view would seem to be confirmed by a very simple experiment, which I doubt not will have occurred to others.

The impression generally left on the mind after consulting our standard works is, that white of egg consists of pure albumine held in solution and accompanied by certain salts of soda and phosphate of lime, and that the precipitate formed by the addition of the metallic salts is a compound *not* resulting from double decomposition, but from a simple substitution of the albumine for the acid of the salt. Taking for example nitrate of silver, one would imagine that (the soda-salts and phosphate of lime being first neutralized) we should have albuminate of silver and free nitric acid resulting. Practically nothing of this kind is indicated by experiment; for, by adding neutral nitrate of silver to white of egg, we get no acid reaction to test-paper, which is sufficient to negative such a supposition as I have just instanced.

If we accept the French and German theory, this fact is easily understood, as follows:—

Albuminate of soda + nitrate of silver = nitrate of soda + albuminate of silver, in which, by double decomposition, two salts are formed which should be neutral.

To experiment, however, satisfactorily on the metallic and other combinations of albumine, it is necessary to obtain a pure albumine in a soluble state, which may be accomplished by the process of Wurtz as follows:—

Take any quantity of white of egg, and having well whipped it, strain through linen. To the filtered liquid add a solution of subacetate of lead till all the coagulum is thrown down, but taking care not to add an excess, or the coagulum will be re-dissolved. Throw the mass upon a linen filter, and wash repeatedly, and then, stirring it in a bottle with a sufficient quantity of water to reduce it to the consistency of cream, a current of carbonic acid gas to be passed through it till the liquid clears by the precipitation of carbonate of lead and re-solution of the albumine.

The liquid albumine is now to be filtered, but contains traces of lead, which have to be removed, also possibly a certain amount of acetic acid, which may have been left about the precipitate in spite of the washing. To remove the lead, a few drops of solution of sulphuretted hydrogen are added, which immediately blackens the liquid by the formation of sulphide of lead, which is further removed as follows:—The bottle containing the dark liquid is put into a bain-marie and the heat gradually raised to about 140° Fahr.; as it approaches this point it must be carefully examined, taking up from time to time a little of the contents in a glass tube and holding it up to the light; the moment the first appearance of coagulation commences, the bottle must be removed from the bain-marie and allowed to cool, when the first flocks of the coagulum carry down the sulphide, and a clear liquid is obtained by filtration, which should give no further reaction either with subacetate of lead or with sulphuretted hydrogen. The liquid must finally be evaporated to dryness at a gentle heat (say, not exceeding 110°), when any traces of acetic acid will (if present) be removed. The solid substance is pure albumine, perfectly soluble in water.

When dissolved in distilled water, pure albumine has a decidedly acid reaction on test-paper, and behaves generally in a similar manner to ordinary white of egg with the acids and metallic salts, though not entirely so in all cases. A most interesting series of experiments with the metallic salts may be undertaken; but as photographers are principally interested in its combinations with silver, I shall only indicate the following, premising that the amateur, unless a well-skilled manipulator, should, like myself, carefully repeat his experiments before arriving at a hasty conclusion; for it must be remembered that, adopting the formula before given, the atomic weight of the compound, albuminate of silver, (taking Oxy. 8 as a standard) is 1734, and, the atomic weight of silver being 108, it is evident we have only about one-sixteenth part of silver present, so that, working on small quantities, the operations become somewhat delicate.

Let a solution, perfectly neutral, of nitrate of silver be prepared, and add it gradually to a solution of pure albumine in a test-tube till coagulation ceases, then filter off (through clean linen) the clear liquid, and wash and teaze the precipitate till its washings contain no traces of the silver-salt. On examination of the liquid first filtered from the coagulum, it will be found distinctly acid to test-paper; and as the acid albumine has been entirely precipitated, it may fairly be supposed that the reaction is due to nitric acid liberated; and further, on applying the indigo-test (using pure sulphuric acid in its preparation), the bleaching action characteristic of nitric acid is shown.

If we now examine the coagulum, the presence of silver or its oxide is most readily detectable, as follows:—

1. Let a portion of the coagulum be digested with ammonia in a sealed test-tube, it gelatinizes and ultimately dissolves; sulphuretted hydrogen produces, when added, a dark-brown discoloration.

2. Another portion dissolved in nitric acid with the application of heat, is rendered turbid by the precipitation of chloride of silver when tested with chloride of sodium, and is likewise darkened with sulphuretted hydrogen.

3. Another portion is heated to redness in a tube, and the black residue is treated with nitric acid; this solution also darkens with sulphuretted hydrogen.

One fact in this last experiment which seems to negative the supposition that the compound of albumine with nitrate of silver should be regarded as an albuminate of the silver, or albumino-nitrate of silver, is the following:—

When the coagulum is calcined in the manner just described, there is no disengagement of nitric or nitrous acid vapour; and a test-paper placed in the upper portion of the tube retains its colour. Taking this fact in conjunction with the presence of liberated nitric acid in the liquid first examined, I think we may fairly conclude that the term so long established, viz. albuminate of silver, is correct.

I trust that the length of this communication will be excused when the interest of the subject is taken into consideration, and in conclusion would wish to remark that it is offered solely with the view of endeavouring to impart to my fellow-students, not anything of value originating from myself, but some valuable information derived from reliable sources.

EGBERT MOXHAM.

Can the Lightning-flash be photographed?

To the Editor of the Photographic Journal.

SIR,—A Correspondent, in his paper entitled "A Linnæan Systematization of the different branches of Photography," published in the Photographic Journal of September 15, asks in a foot note, "Could the flashes of lightning (very much varied in their shape) be seized by the camera?" I beg to state that I made an experiment during one of the storms which occurred during the past summer, with a view to determine this point, but did not come to a satisfactory result. I obtained abundant evidence (as might be expected *à priori*) of the diffused action of light upon a collodion plate, but got no definite picture, owing to the extreme difficulty of focusing correctly by the flashes, which, though intensely vivid, were so momentary (and probably in an ever-varying plane) that my first effort was foiled. I must confess it was rather directed towards the obtaining a picture of distant objects by *the light* of the flash, than of the flash itself; but what I *did* get was undoubtedly a picture not of one, but many flashes, badly focused, and forming an irregular and confused outline when developed. Finding the focus incorrect in the morning—for I left the camera "in position"—I kept one in readiness for some time properly focused, in anticipation of another storm, which, however, did not come. I trust to repeat the experiment, both as regards the landscape and flash.

THOMAS R. WHEELER.

10 The Grove, Blackheath.

Negative Albumen Process on Paper.

To the Editor of the Photographic Journal.

Glenhead, Kirkentilloch,
November 1, 1859.

SIR,—Should you think the accompanying process of interest to your numerous readers, I shall be glad if you give it a place in your next Journal.

AlthoughI am about to offer to your readers nothing new, still, as I have found the process I am about to describe very certain in its results, and, as far as my own experience goes, every way easier than the waxed-paper process, perhaps some of your readers, from the simplicity of the process, may be induced to give it a trial; and to those who may do so I promise them, with anything like ordinary care in the manipulation, results every way as good as waxed paper could produce.

Having been much struck with the photographic properties of albumen in various ways in which I had used it, and having by me some which I had prepared for the Taupenot process, I filtered it into a dish and floated some plain paper on it, which I sensitized also in the bath prepared for that process, and exposed for three

minutes in a camera having a 3¼-inch lens, ½-inch diaphragm, and 16-inch focus, and was agreeably surprised, after treating it with gallic acid and a few drops of the bath, to see the picture gradually making its appearance, but found that I could not bring up sufficient detail and contrast to print from. However, finding that pictures could be produced in this way, I set to work with fresh albumen and various proportions of iodides and bromides, and at last reached results superior to anything I had obtained with the waxed paper. I have as yet only kept the paper for eight days after sensitizing; and up to that time it was perfectly good. I have developed two pictures about forty-eight hours after being exposed in the camera, and could see no difference between them and those developed on the evening of the day on which they were exposed.

In this process the picture is entirely on the surface of the paper, the back remaining perfectly white, and the impression very beautiful and sharp; when carefully focused, and with anything like care in the manipulation, success is next to a certainty.

Having said thus much, I shall proceed to give the proportions of albumen and chemicals I found to answer best. First of all I take, say 5 ounces of albumen, and dissolve separately 50 grains of iodide of potassium and 15 grains bromide of potassium, in just as much water as will take them up; and after they are dissolved I add the whole to the albumen, and beat it up for at least a quarter of an hour, after which I allow it to stand for twelve or more hours, then filter through sponge into a dish sufficiently large to float the paper on, taking care that no air-bubbles come between the paper and albumen. It is allowed to float for three minutes, then taken up by the two opposite corners and placed diagonally over the back of a chair (or on a line) on which a piece of blotting-paper has been previously hung; in this way the current of albumen has only to run down half the sheet, and the blotting paper carries off the excess as soon as it reaches the corners, and in this way sheet after sheet can be albuminized and iodized (by this one process); and the paper, if kept dry, will remain good for a very long time at this stage, and is at any time ready for floating on the sensitizing bath, where four or five minutes is sufficient, after which it is to be again floated on two (or three if it is to be kept long) different dishes of distilled or rain water. When removed from the last it is put into clean biotting paper, and can be used after being blotted off, or kept until wanted.

The paper is developed with gallic acid; and I generally keep the water of the first dish I wash in after sensitizing, for adding to the gallic acid in developing,—two-thirds gallic acid (saturated solution), and one-third of the water of the first washing dish. The resulting negative is afterwards washed in five or six different waters, and can be then fixed in the hypo-bath, or it can be dried and kept until it is convenient to do so.

I would caution those who try this process to be exceedingly careful of white light when sensitizing the paper, or of allowing light in any way to reach it after it has been sensitized; or it will turn black on the application of the developer, and the picture be only seen through a haze.

ALEX. WALKER.

On Cleansing the Hands.

To the Editor of the Photographic Journal.

Gennings, Nov. 10, 1859.

SIR,—On looking over your notices to correspondents, I still continue to see that some of them clean their hands with that abominable stuff called cyanide of potassium. I would ask these gentlemen for once to do without it and try my plan, which is this—viz. to wash the hands well with soap and water *as soon* as the photographing for the day is over, and then, while the skin is still wet and soft, to rub the stains with a flat piece of pumicestone, occasionally, if necessary, re-softening the skin by another washing.

This will remove the stains more effectually and pleasantly than any method with which I am acquainted. I have used this plan for many years, but have never seen it suggested in print. There need not be the smallest fear of rubbing through the live skin.

J. M. S. B.

On the Action of Light upon Nitrate of Uranium in the presence of Starch. By HARRY N. DRAPER, F.C.S.

I HAVE repeated an experiment by Dr. Phipson, in which an *organic* colouring matter is stated to be produced when starch covered with a solution of nitrate of uranium is exposed in a flask of white glass to the action of light. The only notice of this experiment which I have yet seen has been a casual paragraph in a Photographic periodical; therefore my deductions from, and explanation of the phenomenon may have been anticipated. Nevertheless, as I believe that an incorrect idea of its cause was, and perhaps is still entertained, I volunteer an explanation grounded upon a chemical analysis.

Wheaten starch to the quantity of about 20 grains was shaken with a saturated solution of

nitrate of uranium in a phial of colourless glass, which was then placed opposite a window. After three days a darkening of the starch deposit was distinctly noticeable, and after a week, enough of the coloured product had been obtained to admit of its examination.

The deposit was collected upon a filter and washed with distilled water until the washings gave no indication of the presence of the metal. The starch during this operation still retained its purple tint, but when the washing was concluded the colour gradually faded to yellow. The mass was next ignited, the ash treated with nitric acid, in which it partly dissolved, and the solution finally diluted with water and evaporated to dryness. In this way a residue was obtained of a yellow colour, very soluble in water, and giving with reagents all the indications of a uranium salt.

I argue therefore that the coloration of the starch is to be attributed to the reduction of the peroxide of uranium to the state of protoxide; nor do I think that any "organic" compound of the oxide is formed with the starch, but that each starch-granule becomes covered with a coating of it. This is, I think, amply proved by the fact that the purple changes to yellow as soon as—removed from the protective influence of the solution—it is exposed to the action of atmospheric oxygen.

The fact of this coloration is in itself very interesting, both in its chemical and photographic bearings; and I shall be glad to hear of additional experiments in the same direction.

Mr. Sutton's new "Triplet."

To the Editor of the Photographic Journal.

November 1859.

SIR,—I was somewhat surprised on reading the Report of the Committee on Lenses appointed by the Photographic Society of Scotland, in the Number of the Journal for September, to find that the palm was awarded by the Committee to Mr. Sutton's new "Triplet" lens. I have not, I regret to say, sufficient knowledge of optics to judge of the correctness of the theory of this lens, as published by Mr. Sutton in the Journal; but from some pictures taken by a "Triplet," which an enthusiastic friend had got immediately on the lens being brought out, I formed a by no means high opinion of its capabilities. No doubt the lines in these pictures were, as the Report stated to be the case in pictures taken with this lens, quite straight; and so far this was a great improvement on the old form of lenses, or on the new-fashioned "Orthoscopic," "Orthographic," "Petzval," "Aplanatic," or "Caloscopic" lenses. But then, unfortunately, it seemed quite impossible to obtain even a very moderate degree of sharpness with the Triplet,—a defect which, combined with the general mistiness of the pictures, rendered the lens apparently worthless; for I need not say that, although for many subjects a lens which does not give straight lines is not objectionable, it *is essential*, for *all* subjects, that the lens should give sharp definition,—not to speak of flatness of field, and depth of focus.

After these trials, then, I thought no more of this lens, further than to resolve that should I ever desire a new lens, this, in its present form, was the kind which I would *not* get. My friend, however, appears to have had a greater confidence in the Triplet theory, or in its author, than I had, and which, as will now be seen, has had its proper reward: for he has just shown me pictures taken by the very same lens which I before formed so poor an opinion of, which in sharpness and general definition are at least equal to pictures of the same subject taken by the Petzval form of lens (which, however, by the by, are scarcely equal in this respect, I think, to the old form of lens), whilst the lines are to all appearance *straight*—presenting a remarkable and most pleasing contrast to those of the other pictures.

To effect this wonderful improvement in the working of the lens, no alteration has been made, I am told, but in the *mounting*. It seems that formerly the mounting had been so defective, although made by a well-known optician, that an immense quantity of reflected light was allowed to fall on the ground glass and confuse the image. This my friend has had remedied in a rough way; and now the image on the ground glass has a totally different appearance from that which it formerly presented, and the resulting pictures are, so far as I have seen, more nearly *perfect* than those produced by any other lens.

For taking architectural subjects, I now perfectly agree with Mr. Sutton that this lens is indispensable.

ONE WHO HAS BEEN AN AMATEUR PHOTOGRAPHER FOR THE LAST 15 YEARS.

"Halation" of Photographs.

To the Editor of the Photographic Journal.

5 Collins Street West, Melbourne, Victoria,
12th September, 1859.

SIR,—In the last Number of the Journal which I have received (No. 86), appears a communication from a correspondent respecting a defect in photography which has puzzled many operators; and in the hope that any in-

formation on the subject may be valuable, even coming from the antipodes, I venture to address a few lines to you.

I have always found that the best way to remedy a defect is to discover a means by which a similar defect may be produced, and in this way have been enabled to trace to its source the annoyance alluded to.

My practice in photography is nearly wholly confined to portraiture; and in order to obtain results as nearly uniform as possible, I find it necessary to vary my proceedings with every alteration in temperature, and, as nearly as I can judge, with every change in actinism. When I tell you that I have known the thermometer in my room to fall 40° in one hour, you may be assured that such alterations are not from mere fancy, as many photographic processes are, but result from sheer necessity.

When the thermometer in my operating-room ranges between 90° and 110°, it is necessary to be pretty liberal in the use of curtains and blinds in order to exclude all the direct rays of the sun, and make the place tolerable (!) for my subjects (victims I might almost say); and when this is the case, I, of course, suffer great inconvenience from the deprivation of so much of my chief working material—light; and what I require in this respect I am compelled to supply by the action of my chemicals.

Under such circumstances I derive much benefit from the use of bromides; and I may say, for this purpose they are invaluable, and may be used, in a very subdued light, to an extent which under other circumstances would utterly destroy the picture.

If I use a faintly acid nitrate of silver bath, with a collodion prepared with a mixture of iodide and bromide, and in which is the largest quantity of bromide admissible, I can depend upon obtaining results in a subdued light, and at a high temperature, which would be impossible with a collodion prepared solely with an iodide: hence the value of a bromide.

If with the same bath and bromo-iodized collodion I take a picture in a moderately strong light, and with a temperature ranging even as low as between 60° to 70°, I can depend upon getting the defect alluded to by your correspondent, viz. the appearance of a *halo*, surrounding any white object in the picture, and showing with distinctness on the dark portions of the drapery in the immediate vicinity of the white objects. This appearance is altogether different from the solarization produced by the plate being exposed in the camera a longer time than necessary, or the effect of too prolonged development.

On resorting to a collodion differing in its composition only in containing a smaller proportion of the bromide, the annoyance is removed, and the peculiar appearance (to which, until a better one is found, I have applied the term "*halation*") gives place to pure rich blacks, which contrast strongly with the brilliancy of the whites.

The obvious remedy is, in sensitizing the collodion to use plain iodide (whichever description preferred), and from the stock so prepared take such portion as may be required for the occasion, and add to it sufficient bromide only to make it work satisfactorily.

The most convenient form for bromides for general use is an alcoholic solution; and it is better to add it to the collodion the day before required for use; and should there be any precipitation, the clear portion may be poured off. I have obtained the above information in the course of my six years' practice, and am fully convinced of its truth.

G. W. Perry.

Latest Intelligence of Foreign Science and Art.
From a Correspondent.

Russian Books for the Public Library of Athens.—Prince Constantine having, during his last stay in the Greek capital, observed the scarcity of Russian books in the library of the Academy, has had forwarded to that establishment a collection of nautical works. The Church Synod of St. Petersburg has added to this present some works of an ecclesiastical character.

France.—M. Goïffe has exhibited lately at Rouen a new electro-magnetic apparatus, for producing, by the action of an electric current, the engravings of the metallic cylinder for the printing of the different silk and cotton stuffs. Hitherto two operations were required for printing on textile fabrics,—viz. the making of certain stiles of steel for producing the impressions on the rollers, and the art of engraving of the latter. M. Goïffe, in adapting partly the electric process of M. Bonelli, has succeeded in combining these two operations into one, by which, as stated by him, a saving of 50 per cent. on the printing of cambric, &c. will be saved.

Munich. Art in a financial point of view.—The Munich Royal Bronze Foundery has now obtained universal fame over the whole world; and its products adorn the cities of Europe and America. The last-mentioned part of the world has had the monuments for her champions of liberty all cast here, which will form the chief ornaments of the Museum of the Bronze Foundery shortly to be opened, where all the casts and models will be exhibited to public view. The last work produced here

is the colossal statue of Henry Clay, the American statesman. It has been ordered for the State and city of New Orleans; but the model is the work of an American sculptor, Mr. J. Hart, who, however, chose Florence as the place where he constructed his model. It may be imagined that such huge bronze castings are very costly, and that thus the sums which King Louis of Bavaria once spent in art, are now coming back with interest to the German and Bavarian artists.

An Album of the 13th Century.—M. Lassus, the celebrated Paris architect, has just published the album of "Villard de Honnecourt," a quarto volume issued from the Imperial press. The designs of Villard are not those of a modern architect, drawn to such or such a scale; they are only ideas and indications of the forms and plans of building which he saw abroad, and which, when he returned home, he endeavoured to imitate. He became the architect of parts of the cathedral of Rheims (in 1240), and the choirs of the Church of Notre Dame de Cambray. Subsequently he was called to Hungary and to Cracow, where he built a church in 1260. The plates, drawn after the originals, are very characteristic and new to the Art-literature of the middle ages.

Paris. Large Panorama.—The monumental Panorama which the city of Paris has erected in the Champs Elysées is now completed. The rotunda is 40 metres in diameter, and contains 1750 metres of surface. The internal decoration consists of a portico of four columns, at the entrance; the exterior walls contain niches, above which marble tablets will be placed. This is probably the largest Panorama-building in the world.

CORRESPONDENCE.

If any gentleman whose name has been accidentally omitted, in the List of Subscribers to the Archer Fund, will forward the same to Sir William Newton, or to the Editor of this Journal, the correction shall be made in our next.

What is Chloride of Gold?

"London, Nov. 12.

"Sir,—Some few days since, I called at one of our first photographic establishments, for 18 grains of chloride of gold, for which I paid the usual price. On opening the paper in which the bottle was enclosed, some few days after, I found that, instead of what I had asked for, I had been supplied with *twenty-five grains* of "a non-deliquescent compound," 2 grains of which are described on the label as being equal to one of the chloride. On mixing it in the usual way, a thick deposit was formed, which being removed by filtering, left the bath *minus* any colouring property. I will mention no names, my only object being to advise photographers, when they ask for chloride of gold, to make sure they get what they pay for. I have written to the proprietors of the establishment, but have received no reply. Sold for Gold."

We believe that chloride of gold is extensively adulterated with chloride of sodium, as is also nitrate of silver with nitrate of potash. Many persons have failed in their operations from obtaining adulterated chemicals, and attributed their want of success to wrong causes. You must deal with houses of *known* respectability.

A Constant Reader.—"If 'A Constant Reader' will add a little acetic or nitric acid to his silver solution, he will find the precipitate he complains of disappear, as it is caused by the alkaline condition of the bath, in which state it attacks the albumen, causing it to fall off the paper. The bath ought always to be acidified after filtering through kaolin. J. A. Jeffrey.

"Cheltenham, Oct. 22, 1859."

J. H. S. (*Slade Aston*).—"Will you have the kindness to inform me if it is better not to cut anything from the centre of stereoscopic prints, but take the whole from the ends, before reversing and mounting them?"

You will find that a portion cut from each side of the picture gives the best effect. If 2¾ inches is the measurement from any given object of one picture to the relative object in the other, the result is satisfactory to nearly all sights.

Silver Stains on the Hands.—"Those of your readers who still continue the use of cyanide of potassium to remove stains from the fingers will find the following mode, which I adopt, perfectly successful, and I believe perfectly harmless:—After operations, wash your hands in warm water. Apply a saturated solution of iodide of potassium to any stains which remain, and then rub over the yellow spots of iodide of silver a little saturated solution of hyposulphite of soda, and wash off. M. D."

H. W. F. and *a Belgravian* will find a reply to their questions in the present Number.

A Novice.—First learn to print; and after you have managed to do that to your satisfaction, you may commence the use of collodion. A stereoscopic glass is very easily manipulated with, and should be used for your first attempts. The failures are of comparatively little importance, as the quantity of chemicals wasted is small.

Kilkenny.—Your communication shall be forwarded to Mr. Lyndon Smith.

Enquirer.—You must consult our advertising columns; but, as we believe you have been badly used, a private letter shall be forwarded to you.

Mr. Ennel, Mr. Goddard, and *N. S. Heineken's* communications are in print, and we very much regret their non-appearance in the present Number, which want of space compels.

Communications received.—R. C. Galton; W. H. Lintott; Mr. Gutch; Sir W. Newton; Mr. Robinson; Mr. C. H. Bennett; T. Busby; Mr. Cumming; Mr. Badcock; Mr. Dalmeyer.

A parcel containing three photographs from Jersey is on our table, but unfortunately the accompanying letter has been mislaid. Will our correspondent kindly address us again?

Letters of inquiry to the Editor can only be answered through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. Taylor and Francis, Red Lion Court, Fleet Street.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 92. DECEMBER 15, 1859.

In the first Number of our Journal for the present year, we incidentally drew public attention to our name as a literary and scientific publication, for a reason which became apparent in the subsequent Numbers. Mr. Greenwood of Liverpool, a gentleman who, by his enterprise has done service to the art we represent, in taking broader ground for his labours, and in appealing to a larger public than that which he had locally gained in Lancashire, assumed for his publication, though without, as we believe, the intention of invading our copyright, the designation by which we are familiarly known to the publishing trade and the scientific world. This double appearance of a Photographic Journal led to no little confusion, not only in the book trade and among advertisers, but even to our more immediate subscribers. The confusion of title to which we refer, and the details of which must be obvious to all readers, was found no less embarrassing to Mr. Greenwood than to ourselves. It was of importance to both parties that it should cease at the earliest possible moment; and not less important, as a matter of good feeling and of business regulation, that it should be made to cease in good faith, in a friendly manner on both sides, and in such a way as to remove for ever all question of conflicting copyright in the title.

Mr. Greenwood's interest and the Society's interest in the progress of photographic discovery and in the success of photographic publications are the same. We respect our fellow-labourers in the art; we desire for them the widest publicity and the largest profit; and we believe that Mr. Greenwood will very readily and sincerely extend the same sentiment of respect and the same good wishes to ourselves. Neither party in the dispute had any inveterate determination to bring the matter into a court of law. We can answer on this point for ourselves, though we entertained a perfect conviction of our right and of our ability to make that right clear in a court of equity. Under these circumstances both sides consented to refer the case to an arbitrator—each binding himself by an undertaking to stand by the award. Mr. Greenwood named three gentlemen. The Society at once accepted the name of Mr. Bohn, the celebrated publisher, one of Mr. Greenwood's referees. A written statement of the case from both parties was then placed in Mr. Bohn's hands; and after careful consideration of the merits, his verdict has now been given in the following terms:—

Re " The Photographic Journal."

After reading over all the allegations and replies in this matter, and duly examining and weighing them in connexion with the exhibits, I have arrived at the following conclusions: namely,—

That the Proprietors of what in 1854–1856 was published at Liverpool under the title of " The Liverpool Photographic Journal," and in 1857–1858 as " The Liverpool and Manchester Photographic Journal," were not justified, either morally or equitably, in changing their title in January 1859 to that of " The Photographic Journal," this being the familiar title of the concurrent " Journal of the Photographic Society of London," which since its commencement in 1853 has uniformly and officially been superscribed by their own binder as " The Photographic Journal," and under this condensed name is generally recognized as well by its Proprietors, Editors, and Correspondents, as by the book trade at large.

I am further of opinion that the said title,

"The Photographic Journal," as adopted by the Liverpool Proprietors, is in no way altered or qualified by the small lines of type beneath it, which really form no part of the title, and might at any convenient time be omitted. I have no hesitation in deeming the title, though so printed, an infringement on that claimed by the Photographic Society of London, and likely to mislead the public and occasion damage to the plaintiffs.

The Liverpool and Manchester Photographic Journal is not known to London Publishers under any shorter title than "The Liverpool Photographic," and is never named without its Liverpool prefix, whatever it may be in its own immediate locality.

I think the copyright entry of the title "The Photographic Journal," made by the Photographic Society of London in December 1858, with the object of securing a title belonging to them, and which they saw was about to be invaded, a justifiable precaution.

Finally, I hold that the Liverpool Publishers are bound to relinquish the title they have assumed, substituting for it any other which will leave no room for misapprehension as to the distinctness of the two Journals.

(Signed) Henry G. Bohn.

York Street, Covent Garden,
December 3, 1859.

Thus the matter ends, so far as we are concerned. Our right is distinctly established. The Photographic Journal, being the Journal of the Photographic Society, will consequently continue to appear under its present and familiar title. As yet, we have not heard of the exact designation under which our rival and coadjutor will reappear; but we take it for granted that Mr. Greenwood, in the exercise of his businesslike ingenuity and intelligence, will adopt a name free from any sort of ambiguity. Under whatever new title—and many are open—it may come out, it will have our warmest wishes for its usefulness and success. There is room in the world of art for many labourers; and the greater the enterprise exhibited and the prosperity attained by Mr. Greenwood, the greater cause shall we, and all lovers of photography, have to rejoice.

PHOTOGRAPHIC SOCIETY.

Ordinary General Meeting.

Tuesday, December 6, 1859.

Henry White, Esq., in the Chair.

The Minutes of the last Meeting were read and confirmed.

The following gentlemen were elected Members of the Society:—Captain Wynne Charles de Cerjat; Henry George Bohn, Esq.; George Bohn, Esq.; The Hon. William Vernon; Frederick John Longstaff, Esq.

The Chairman stated that the following list had been prepared, according to the Rule which requires the Council at the Ordinary Meeting in December to lay before the Society a list of those Members who retire, and of those whom they recommend for re-election into the Council:—as

Vice-President—C. B. Vignoles, Esq., F.R.S.;
Treasurer—Arthur R. Hamilton, Esq.;
Secretary—Hugh W. Diamond, M.D.;
all of which Officers are recommended for re-election.

Retiring Members of Council—The Rev. John Barlow, M.A., F.R.S.; Peter W. Fry, Esq.; J. D. Harding, Esq.; Matthew John Rippingham, Esq.; Alfred Rosling, Esq.

For Election into the Council—Professor Philip H. De la Motte, Esq.; Joseph Durham, Esq., F.S.A.; Arthur Farre, Esq., M.D., F.R.S.; John Dillwyn Llewellyn, Esq., F.R.S.; Professor Wheatstone, F.R.S.

C. Silvy, Esq., who was elected a Member of the Society at the last Meeting, presented three large and very fine photographic prints of his own production.

Mr. Moginie exhibited his portable tent Camera, which, in addition to its great portability, appears to combine many other advantages, and to be of great practical utility to photographers.

Mr. Palmer exhibited some improved Glass Baths, at very moderate prices, and which seem to be calculated to supersede the use of gutta percha in most instances, as well as of the earthenware and flint glass now in use. Mr. Palmer's baths are made of sheet glass, and are not affected by any solution which may be put into them.

Mr. Ennel said that the few trifling things he proposed to have the pleasure of communicating to the Society were, to the best of his knowledge, new to the photographic world, and of course, as he thought, improvements. He proposed to follow the usual order of photographic operations, and scatter his remarks as they occurred to him; he might now and then digress, but there would always be certain land-marks, sufficiently salient, by which he could find his way back again. He would begin with the first, and which is a most important operation, that of cleaning the plates. We have pastes, powders, and liquids on the one hand, and simple washing on the other. They were all very good, if we only used them in the right way: we may very frequently strictly adhere to a rule, and yet violate the principles upon which that rule is based. But there are a great many principles involved in cleaning plates, which, he said, he would not attempt to enumerate; he would mention one circumstance:—there was hardly a substance which did not adhere to glass; indeed, he knew of no substance that was really repelled by it, though the attraction of adhesion was more or less with different substances; the question was, how to get those

foreign substances away from the plate. With simple washing it could not be managed: the friction between the water and the plate is so very small, that it does not overcome the attraction of adhesion; it was like the old trick that puzzled children so much—that of putting a shilling in the palm of the hand, and attempting to brush it off with a stiff clothes-brush, the friction not being sufficient to overcome the adhesion between the shilling and the palm of the hand. He instanced the developing glass, roofs of glass houses, &c., that could not be washed clean by water without friction. Acids only create another deposit, and a bottle-brush or its equivalent must be resorted to. He exhibited a flask with a deposit of carbonate of lime adhering to it; no washing would avail; but, on applying simply a feather, he at once cleaned it. Washing a plate under a tap did not appear to him to be the right way, because the drippings on the glass will certainly afterwards adhere to it; it is much better to immerse it in clean water, edgeways, so that all the deposits shall sink down to the bottom; then the glass must be rubbed dry immediately. Altogether there are *several* operations involved in washing, which give trouble; and, after many experiments, he found nothing better than the old tripoli-powder just moistened, rubbed on with a roll of flannel, and immediately rubbed dry with linen or calico (not silk); and that operation was very simple indeed when the cleaning-board was used. There were many cleaning-boards in use, but he exhibited one to the Meeting which he considered an improvement. It consists of an oblong board, with a narrow strip cut out diagonally to allow a screw to pass from one corner nearly to the other. The screw head passes through a piece of wood triangularly shaped, and bevelled off towards its apex. This apex is cut off and an angle cut in, so as to receive the one corner of the glass. At the back of the board, a nut fixes this moveable angle at any given point. At the extreme corner of the board there is a similar angle fixed. Between these two angles, the glass, of any size, is kept tightly screwed in, with its whole surface *and edges* exposed to the cleaning media.

Mr. Ennel then referred to the coating of plates, upon which a great deal had been said. For small plates he did not consider it signified much whether you coated the plate by pouring on in the centre or at the side: for large plates he preferred coating from one side, in a similar way as he poured on the developer; and that avoided the double layer of film in parts of the plate, so frequent in summer, especially with large plates and with cadmium collodion. Mr. Ennel exhibited a collodion-pourer by Hughes, and another by Brown of Farringdon Street, which did not allow the film to set in the neck, the vapour of the ether keeping it in solution; but he preferred the usual bottles. All his bottles had straps of india-rubber, which prevented the ether, &c., blowing out the stoppers.

Mr. Ennel then proceeded to the dipping, and urged as a reason for preferring the "poor" glass dipper over the silver-wire dipper, that though the glass was liable to break, in clumsy hands, it did not bend as did the wire, and the glass was the cleanest of the two. It had been urged that the wire did not adhere to the plate as did the glass dipper; but Mr. Ennel contended that the adhesion was an advantage—it prevented the plate from falling off; and by sliding the plate off over the bath, and scraping the back of the plate against the edge of the dipper, he saved an immense deal of silver. After immersing a plate he never touched it with his fingers, but took it out with what is called an American clip, only modified and adapted for the purpose. He inserted a piece of blotting-paper between the lower edge of the frame and the plate, so that the blotting-paper nearly touched the front of the frame, bent the paper over, and then got rid of the clip by suspending the plate for a moment with a wedge-shaped piece of wood. He had the camera at the Meeting because it had been the subject of discussion some time ago. The operations of putting the back in, exposing, and taking the back out again, were certainly very quick, compared with the usual plan. After exposure he again avoided touching the plate, by lifting it partly with the wooden wedge, to take hold of it with another similar clip for small plates, and another with a projecting support for large plates. Thus, he had neither pyrogallic acid nor silver upon his fingers. Some persons thought it right to carry about to the world the photographic sign, and show, at least in one sense, that they had photography at their fingers' ends; but in respect to fingers or plates, he held with Lord Palmerston's definition of dirt—that it was matter in the wrong place.

Mr. Ennel then exhibited his universal levelling-stand (which will be illustrated in our next Number, together with the other apparatus he exhibited).

Supposing the negative to be varnished or not, according to the circumstances (although he might say that there was one negative which must be varnished, and that was when it was intensified by bichloride of mercury)—unless it be varnished, the mercury will find its way to the silver in the paper when brought in contact, and fill it with spots. In printing, he understood that a great many negatives were broken in the ordinary pressure-frame; he never had any broken, because he never used the printing-frame; he devised a hinged mahogany board with a cloth over it, and with a series of clips, in which the fulcrum was so situated as to allow them to be stood up or laid down. He also used unhinged frames, of wood, slate, or glass, as Mr. Hennah of Brighton, except that the latter uses plate glass to press down the negative, whereas Mr. Ennel uses clips. He thereby avoids displacing the negative when lifting the plate glass, and, moreover, he is not confined to the horizontal position. His presses were safe, cheap, portable, did not take up much room, and were very convenient for vignetting. Another operation which calls for the application of the clip is the sensitizing the paper, when, instead of taking it out with the fingers and then pinning it, he takes it up by the corner with a clip, and then places the clip with the paper upon a shelf, and there is no more trouble with it, except to put a narrow strip of bibulous paper, about an inch long, in contact with the lower corner of the paper to draw off the lingering surplus silver bath. When the prints are obtained and washed, they are hung up to dry in the same manner.

Upon referring to the washing-dish, he observed a principle that had not before been remarked upon. Mr. Ennel then produced a large flat circular yellow earthen dish with a hole drilled through its side, into which was cemented a glass siphon; above the dish, from a tank, hung another glass siphon with an india-rubber joint, to which was attached a regulating clip (a clip with nut and screw, like a hand-vice). It was necessary that the supply should be much less in proportion to the quantity drawn off by the siphon in the dish, and the water kept constantly in motion and ever changing. This kind of siphon with a regulating clip is very convenient for filtering water, or comparatively clear solutions, such as the nitrate bath, by allowing it to discharge itself into a funnel, inasmuch as once set to work it goes on, requiring no attention and producing no stains, and avoiding all spilling, which is not an easy thing with some thick unlipped baths. Mr. Ennel then showed a novel mode of exhausting the siphon by means of an india-rubber ball.

In testing the bath, Mr. Ennel had simply a narrow glass tube, drawn out to a point, with an elastic ball at the other end, by which means he drew up into the tube

20 or 30 drops, as might be necessary. His standard solution of chloride of sodium is very strong (32 grains to the ounce), so that 5 minims will precipitate one grain of silver. Upon pressing the ball at the top, the solution will be *forced* out at pleasure, drop by drop, as long as precipitation takes place, giving the strength of the bath. It was not a very nice mode of testing, and would not do for assaying, but served the purposes of photography, and was an expeditious process.

Upon the subject of dissolving in general, he remarked, it was best effected by suspension. It was a well-known fact, though but rarely practised even by chemists, that if a quantity of salt lies in water at the bottom of a vessel, the fluid surrounding the salt will be saturated, and take up no more, unless you agitate the whole mass, and bring the salt in contact with another portion of water; but by suspension, as fast as the fluid around the salt becomes saturated, and consequently of greater specific gravity, it will fall to the bottom, being replaced by a fresh supply of fluid around the salt, and so on until the whole of the salt is dissolved, or the fluid becomes saturated. As for gum-arabic, it was very convenient to tie it in a muslin bag and suspend it, as it then became more quickly dissolved, filtered itself, and avoided the breaking of glass rods in the awkward stirring from the bottom. Professor Taylor had suggested to Mr. Ennel to try the effect of suspension of nitrate of copper with some nitrate of copper at the bottom of the vessel, and this experiment Mr. Ennel exhibited with a glass test-tube, shewing the blue stream falling. He added that with citrate of iron the experiment was even more striking.

He then applied the same principle to the dissolving of pyroxyline. In the usual way it took perhaps three or four weeks before the collodion was clear for use, whereas if the pyroxyline be dissolved by suspension, it may be iodized the next day. Mr. Ennel exhibited the process of dissolution of pyroxyline, both by the ordinary method and by suspension, using in each case 3 ounces of ether, first saturating each 54 grains of pyroxyline in 1½ ounce of alcohol; one 54 grains he immersed in the ether, and the other he suspended in a piece of cambric, though he preferred Irish linen; by stirring the portion in immersion with a glass rod it was dissolved immediately, but was very turbid, while in the case of the suspended pyroxyline, in five minutes it was not only dissolved but bright and clear; and Mr. Ennel stated that if the linen were sufficiently fine, the solution might be used immediately. Mr. Ennel then coated two plates with these samples of collodion. The one coating could hardly be distinguished from the glass, whereas the other was full of fibres, and dull. The residue in the bag need not be thrown away; it is still good to dress wounds, which was a desideratum to photographers who were constantly using cyanide of potassium. Mr. Ennel then exhibited the means of drawing off the supernatant liquid from any precipitate without disturbing the precipitate, not using an expensive precipitating jar. He did this by means of a siphon with its end kept floating on the surface by an india-rubber ball, with a pin attached to prevent its descent into the precipitate as the supernatant liquid ran off. Mr. Ennel stated he had applied the syphon with the regulating clip for filtering chloride of silver, but he found it would not answer; for as the pores of the filtering paper became more and more clogged with the chloride, the supply was too fast, and the clip could not be regulated exactly to keep up the supply equal to the demand. Then there was much rinsing and stirring necessary, so that he soon gave it up. He felt he required an apparatus which should not only be self-supplying, but also self-regulating, self-stirring, and self-rinsing.—[At this moment a Member said in an under tone, "Don't you wish you may get it?" but Mr. Ennel did not seem to take any notice of it, but produced the very apparatus, only on a small scale, viz. with a Florence flask.]—The principle is that of the bird's fountain, and is applicable to any quantity, provided only that the vessel be not too *high* for the barometrical counterpoise. The flask had its neck inverted, and was suspended in a funnel with filtering-paper in it; the mouth only reached the level of the fluid in the funnel, and when a sufficient quantity had filtered off, air rushed into the flask, displaced as much fluid, stirring and rinsing at the same time, thus exhibiting all the self-acting operations he had just stated. Mr. Ennel also mentioned that he believed it was not generally known that chloride of lime applied to silver stains in linen made them disappear. The chloride of silver thus formed must be washed in hypo, and then rinsed in water.

The Chairman announced the presence of Mr. Joubert, who had kindly promised a present of the proofs of his invention, which will accompany the first Number of the Photographic Journal for the new year.

Mr. Joubert then exhibited a portfolio of prints by his invention, which excited very general admiration; one especially, being a representation of stone ruins, which, placed under a powerful lens, exhibited none of the granulation of the blackened figure which has been so much objected to in some former attempts in the carbon-printing processes. If all we have heard of this mode be correct, it promises to revolutionize the whole system of photographic printing.

Mr. Joubert, very happily, has named his pictures "Phototypes."

PHOTOGRAPHIC SOCIETY OF IRELAND.

This Society met in the School of Art of the Royal Dublin Society, as usual, on Friday evening, the 25th November, Captain Henry, Vice-President, in the Chair.

After the usual business of the Society was disposed of, the Honorary Secretary, Mr. Vickers, brought under the notice of the Society the new prize medals, struck from dies executed by Mr. Woodhouse, of Dublin, which met with universal admiration, both with regard to their artistic and appropriate designs, and also their execution.

The Chairman then proceeded to distribute the prizes to the Members who were awarded them at the last competition.

The medal for the best paper negative was obtained by the Countess of Rosse;

That for the best collodion negative, by Arthur Barlow, jun., Esq.;

That for the best stereograph, by Thomas M. Brownrigg, Esq.; and

That for Artistic Selection of Subject, by Arthur Barlow, jun., Esq.

The Society having reserved to itself the right to print from the prize negatives, for

distribution among the Members, some proofs from the selected negatives were exhibited, the greater number having been already distributed.

Sir J. J. Coghill, Bart., then proceeded to read his paper "On the Mutual Relations of Photography and Art."

After the discussion which ensued on the reading of this paper had terminated, the Honorary Secretary stated that, as the organ of the Society, he felt called upon to give utterance to the universal feeling of sympathy and regret felt by the Members at the recent misfortune which had happened to their Vice-President, then in the Chair, by the sinking of his yacht, with all her valuable photographic cargo on board, in Holyhead Harbour during the recent hurricane. He thought the Society could not soon forget a most charming paper read by Sir Joscelyn Coghill at one of their meetings during the past session, illustrated by stereographs taken by himself on the Spanish coast. The materials for that paper, and the stereographs themselves, were obtained by Sir Joscelyn when on a photographic tour with their Chairman in his yacht. The party proceeded as far as Gibraltar, landing at the various points on the coast, and taking views of whatever was worth notice. When they arrived at that celebrated fortress, Sir Joscelyn was obliged to return home, bringing with him the negatives which he had taken; and it was to that fortunate circumstance that they were indebted for having now any of the fruits of their photographic labours. Captain Henry, however, proceeded on his tour in the yacht, and spent the entire of the summer in the Mediterranean, taking views as he proceeded, and in the autumn returned home. The yacht, with all his treasures on board, had been safely moored in Kingstown Harbour; but just at that time the 'Great Eastern' arrived at Holyhead. The season was advanced, but the temptation was great; so once more the yacht left our shores, and arrived in safety at Holyhead, but not to remain long so, for during the tempest which ensued she was fouled by another vessel, and, with all her precious cargo of photographs on board, went down. He thought, therefore, that he was but giving utterance to the general feeling of the Society when he moved a vote of condolence and sympathy for the loss which their Chairman had sustained.

The motion was seconded by George Woods Maunsell, Esq., and the Chairman then stated that he thanked the Society much for their kind expression of feeling towards himself; it was indeed a source of very great vexation to him that he feared it would never be in his power to present to the Society or his friends any of the views taken during his recent tour. It was only that day he had examined some of the negatives recovered from the sunken vessel, and he feared that they were hopelessly damaged. She was as good a sea boat as could possibly be, and it was not owing to any unseaworthiness on her part that the recent misfortune had happened. But, should he ever sail in her again, or should he ever be the owner of another yacht, the pursuit of photography would still be as dear to him as ever.

Judges were then appointed to award the prizes at the next distribution, and the Society adjourned.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

Nov. 21, 1859.

The 19th Ordinary Meeting of this Society was held this day at the Golf Club House, the President, J. Glaisher, F.R.S., in the Chair.

The minutes of the last meeting having been read and confirmed, Mr. A. J. Melhuish read a paper on "Photographic Printing," as follows:—

There are, I think, few things which appear more easy at first, and more difficult as our experience increases, than Photographic Printing. I well remember my first print: it coloured rapidly a delicate purple-brown; not a tinge of yellow in the sky; and I thought that, although the negative process was rather difficult, positive printing was easy; and, certainly, little did I then conceive how much I had still to learn ere I could produce such results at will. I have now, after many years' experience in this branch of photography, become acquainted, I trust, with every difficulty connected with it, and I am anxious to impart, as briefly as possible, some information, to such of our friends as may not have had much experience in the art, that may be interesting and useful. I may here mention that I shall confine myself this evening to a purely practical view of the subject: not that I do not value the efforts of the chemist and the philosopher—indeed nearly all our hopes rest on them,—but that I think it well to leave this to the performance of abler hands. It will, I think, assist us in forming a clear view of our subject if we consider separately each object we wish to attain in Photographic Printing, and the means best calculated to secure it.

1. Having produced a good negative, our first care should be so to protect it by varnish that a large number of copies may be printed from it without injuring the film. There is at present no better article made than that known as the French varnish: it requires the plate to

be warmed when applied, and left about a day to get thoroughly hard.

2. As unfortunately our negatives are seldom perfect, our next object is, by the process of doctoring, to hide as much as possible whatever defects there may be. This, I am aware, many object to; but, as I am at a loss to see any foundation for such objection, I shall not stay to consider it. We generally find that when a negative has been sufficiently exposed (a thing, by-the-by, of most uncommon occurrence), the sky is so much weakened by excess of light that it requires filling in; and the best thing for this purpose is a mixture of lamp-black and neutral tint. I use Reeves' moist water-colour tubes, with a little ox-gall. It is sometimes required to shade some portion of the picture which prints too dark, such as, for instance, the face of a portrait; this should be done by applying a little lamp-black on the plain side of the glass, and when nearly dry soften off with the finger or a piece of rag. Many a negative otherwise tame and poor may be made to produce brilliant proofs by judicious application of this method of treatment. Having done all required in this way, varnish again with amber varnish: if shaded on the other side, varnish that also; and should the sky ever become sticky, sprinkle it with whiting.

3. Our object now is to obtain a sheet of sensitive paper which will give from a good negative a brilliant proof; this I find, provided the positive paper be good, depends much on the amount of silver deposited on the surface of the paper. I therefore float the paper on a 75-grain solution of nitrate of silver for about two minutes, then hang up by one corner; when nearly dry, I float again for the same time and hang it to dry by the opposite corner: I may add that a strong negative requires to be printed in a strong light, and *vice versâ*.

4. Having obtained a print of sufficient intensity, our next object is to tone and fix it, and upon this part of the process the beauty and permanency of the print mainly depend. Up to this point all is easy and certain; but, now, phenomena of the most peculiar and diverse character appear. Now is the time to produce that "abominable yellow" which so deeply affected Mr. Sutton; now spots, scarcely visible, become first stars, then comets with long flowing tails; now we may obtain that green, that strange green, which is too well known to need description, and which, for want of a better name, I would call the *old hypo-green*; now delicate copies of the cuticle may be seen delineated upon the sky, and now may be seen that very interesting phenomenon of brown patches growing out of nothing. Indeed there is scarcely any limit to the spots and stains and sickly hues which it is our privilege occasionally to witness at this stage of the process; but, on the other hand, now may be produced a picture so chaste, so exquisite, so truly beautiful, that I know of nothing which will bear a comparison with it: there is a transparent bloom upon a fine albumen print that is possessed by nothing else.

The following are the two methods I now adopt for fixing and toning,—the first, when a purple or reddish-brown is required, the second when a violet tint is preferred:—

1st. Well wash the print in common water: fix in new hypo 4 oz. to the pint, leaving the print in about five or ten minutes; then tone in a new bath of 1 gr. gold, 1 gr. silver, ½ oz. hypo, 1 oz. distilled water;—first dissolve the hypo, then add the gold, and lastly the silver; warm the solution in cold weather.

2nd. Wash the print with particular care: tone in 1 gr. gold, 1 gr. carbonate of soda, 1 oz. distilled water;—in a few minutes the picture will be toned; then fix in—2 oz. hypo, 1 pint water; leave in about five minutes.

3rd. Having now obtained a perfect print, our only object is to keep it so; consequently we stop the action here by carefully and thoroughly washing out every trace of chemicals which do not form a portion of the picture. A print should not be washed within less than twelve or more than twenty-four hours; the water should be changed constantly, and the print wiped often on both sides with a sponge. Respecting the failures, the small spots may generally be avoided by keeping the paper dry, and if possible warm, until it is toned; the "abominable" yellow may be avoided by washing the print before toning, and the detestable green by using the toning and fixing baths new.

Having had occasion several times to use the word 'negative' in relation to photography, allow me to protest against this *absurd misnomer*: indeed it is worse than absurd; I do not hesitate to say that it is a positive hindrance to photography. Many a one who has no practical knowledge of the art would understand us if we told him that our pictures were printed from a *reversative*, whereas it is impossible to convey the faintest idea of what we mean to such a one by the astounding assertion that we produce our positives from a negative. When, whilst washing our picture, we see, to our indescribable dismay, the film slip quietly off the plate into the sink, then indeed may we boast a negative; but let us no longer call that a negative which produces such positive results.

Mr. R. P. Napper was proposed as a member of the Society, and, a vote of thanks having been tendered to Mr. Melhuish, the meeting adjourned.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

This Society, so recently originated by its present Secretary, appears to have got into thorough working condition; its Meeting for the present month, held on the 17th instant, was well attended, and there was no lack of interest and instruction promised in its programme.

The Rev. F. F. Statham, B.A., F.G.S., occupied the Chair as President of the Society.

The Chairman called upon the Secretary to read the minutes; these were confirmed, and several donations were acknowledged.

Mr. Leak, jun., presented the Society with a capacious portfolio, and stated that if the gentlemen present would only fill it, he would have another ready to present at the next meeting; he also placed within the folio its first photographs, as an additional gift.

Mr. Hannaford gave several specimens of various printing processes.

Mr. Howard added half-a-dozen very beautiful stereograms, as specimens of the Fothergill process; and

Messrs. Cotton and Wall presented a few other photographs—portraits, copies of prints and paintings.

Mr. Wall, the Hon. Secretary, pointed out the various articles exhibited in the room, among which were—

A camera-stand, for out-door work, exhibited by Mr. F. Howard. Some very fine stereograms (Fothergill process), taken by Mr. Archibald Burns, of Edinburgh, were exhibited, with a number of other curious and interesting slides, by the Secretary. A new, singularly portable, and very complete stereoscopic camera, and dark slides for the dry process, by Mr. Clarke. A very light camera, portable, and capable of being packed into a very small compass (by the same gentleman), intended for large views. A very compact set of apparatus was brought forward by Mr. Hannaford, as used by himself for out-door work.

Mr. Smith, of 16 Mark Lane, exhibited a large collection of rare photographs, landscapes, architectural subjects, copies from paintings, prints, statuary, &c., taken by Fenton, Caldesi, Bingham, Melhuish, A. Watts, and others—a selection chosen with extreme taste and excellent judgment.

A photographic coloured copy, from China, several stereoscopes, and other articles, were also exhibited.

Votes of thanks were awarded, severally and individually, to Messrs. Leak, Howard, Hannaford, Cotton, and Wall, for their prompt and kind donations, and also to the various exhibitors.

Mr. W. Ackland, Vice-President, then read a paper on "The Difficulties of the Dry Processes":—

I purpose this evening to attempt a description of some of the difficulties of the dry processes, and trust the discussion which follows may elicit some explanation of certain defects which sometimes occur, and yet scarcely admit of a lucid explanation.

Before commencing, I would remark that it is my intention to confine my observations principally to the collodio-albumen and Fothergill processes, as those are more frequently employed by the amateur and professional photographer than any others.

The difficulties encountered in the dry processes are:—

Blistering.
Opaque lines in the excited collodion film.
Brain-like markings.
Reticulations.
Water-markings.
Fogging.
Want of intensity.
Insensitiveness.
Stripping off of the film.
Pin-holes in the high light.

Blistering.—This defect seldom occurs in working Fothergill's process, but is often observed in the collodio-albumen, gelatine, and oxymel processes, &c.; indeed, amateurs often assert, that if blistering could be obviated, the collodio-albumen would be the most certain of any known process. Many have attempted to explain the cause of this defect,—one writer ascribing it to dirty plates, another to employing a collodion containing too much ether, and a third too much alcohol, whilst a fourth ascribes all the annoyance to using the iodized albumen too thick.

Now, I propose to attempt no explanation, but to suggest a few precautions. These are—

Never coat a plate in a damp room.

Slightly warm the glass plate before pouring on the collodion.

Let the collodion set until the drop at the lowest corner drained from will receive the impression of the finger before lowering the plate into the bath.

Prepare the iodized albumen from eggs about a week old, in preference to those new-laid.

And dry the plate most thoroughly after the albumen solution is applied, and take especial care to prevent it becoming again damp before the final exciting.

The collodion may be deemed the great cause of blistering, and to this we must turn our attention. This must possess fluidity, yield a creamy film, and be adherent to the glass plate. To ensure fluidity, it should be iodized a month before used, and if, when that time has elapsed, it still possesses glutinous properties and yields blistering plates, we must produce the proper state of fluidity by the use of an alkali added to it. The best plan to effect this is to add to each pint of the iodized collodion about half an ounce of recently and highly dried carbonate of soda, and to shake frequently during two hours. Then let it rest for another two hours, and pour off the upper clear portion into a perfectly dry bottle for use. To ensure a good creamy film, the collodion must be iodized with a mixture of iodide of cadmium and iodide of potassium, and should contain at least 6 grains of the mixed salts to each ounce.

The adherence to the plate is somewhat dependent on the temperature at which the pyroxyline is prepared; for, although very high temperatures have been recommended, it is found advisable in practice not to exceed 150° F. in preparing this substance for the dry process. The collodion mentioned above being highly iodized, requires an exciting bath, containing not less than 35 or 40 grains of nitrate of silver to each ounce, and should be very slightly acidified with acetic acid.

Opaque lines in the excited film is the next defect. These lines occur in the direction of the dip of the plate, and may be traced to one or more of three causes:—

1st. To the plate being immersed in the bath before the film has been allowed to set sufficiently.

2nd. To the exciting bath being too weak; and

3rd. To the accumulation of alcohol and ether in the bath.

This latter cause is one of very frequent occurrence, and is certain to give rise to such lines, more especially if the bath solution is not of full strength. The remedy is to neutralize any free acid that may be present by carbonate of soda, and then to boil in a porcelain capsule for half an hour, so as to expel the volatile por-

tion, and, when cold, to filter slightly, acidify, and dilute if necessary.

To ascertain if dilution is necessary, a bath-tester should be employed. This is simply a glass tube about ten inches long and half an inch in diameter, with a scale of divisions commencing with 0 near the bottom, and extending to 100 near the top. To use it we must proceed as follows. [The bath-tester was produced and handed round]:—

Take of highly dried and perfectly pure chloride of sodium 84½ grains, and dissolve it in 20 ounces of distilled water. This forms the test solution and requires to be made with exactness, or the result obtained by its use will be erroneous. A second solution is also needed; this is made by dissolving 20 grains of bichromate of potash in one ounce of water.

To test the strength of a bath solution, take the bath-tester and drop into it one drop only of bichromate of potash solution, then fill the tube up to the lowest division, marked 0, with the bath solution, and add the standard test solution, gradually shaking at frequent intervals. When the colour of the precipitate, which was at first brick-red, changes to a lighter tint, add the test solution more gradually, and continue to shake up between each addition. Continue to add the test solution, drop by drop, until the red tint of the precipitate suddenly changes to white, showing that all the nitrate of silver is decomposed, and that enough test solution has been added. Now read off the division on a level with the surface of the fluid in the bath-tester, and it will be equal to the number of grains of nitrate of silver contained in each ounce of the bath solution. Thus, supposing, after having performed the experiment, the fluid in the bath tester stood level with the 39th division (counting from below upwards, the same as the tube is figured), this would indicate that each ounce of the bath solution tested contained 39 grains of nitrate of silver.

This plan of using bichromate of potash, to show by a change of colour when all the nitrate of silver is converted into chloride, was published some years since, and, although but little used, answers perfectly in all cases except to test the nitrate of silver bath, after having been used to excite collodio-albumen plates. In this case, the precipitate which forms on adding the test solution remains coloured, however much is added; therefore the use of the bichromate of potash solution must here be dispensed with, and the test solution added, gradually shaking after each addition, and allowing the white chloride of silver which is found to settle down, until the test solution ceases to produce any more cloudiness in the clear portion of the contents. The division level with the surface of the fluid in the bath tester, here also indicates the number of grains of chloride of silver per ounce.

Reticulations, or crape-like markings in the film, arise from a defective sample of collodion being employed; or it may be caused by using a small quantity of collodion to coat a number of plates, as in hot weather the evaporation of the ether leaves the collodion in a condition to give these markings, but may be prevented in this case by adding a few drops of ether from time to time to supply the loss of evaporation. A collodion prone to these reticulations may often be made to give a uniform film by adding to each ounce 8 or 10 drops of chloroform.

Marblings, or brain-like markings, in the high lights of a negative often occur, and may be traced to a defect in the collodion, careless development, or partial washing after exciting.

Collodion yielding a compact film is very liable to possess this defect, and should be at once discarded for one of a more porous nature. Indeed, I may here remark that a compact film is totally unfit for use in any dry process, and is the cause of many of our failures.

Carelessness in imperfectly mixing the pyrogallic and nitrate developing solutions is often a source of these markings, as is also unequal washing after removal of the excited film from the nitrate bath, and the remedy is now of course apparent.

Water markings.—These have been described by a writer in the 'Photographic News' as occurring chiefly in the skies, but occasionally in other parts of the picture, and are of all shapes and forms; sometimes (on a minute scale) very like what are called, in silks and other fabrics, 'water markings,' and at others, patches of varying length and breadth, either ending abruptly or shading off gradually into the upper edge of the film.

These markings were a constant source of annoyance to me in my earlier attempts at Fothergill's process, but, at last, I succeeded in discovering the cause —viz., using a collodion yielding too compact a film. By constantly using Powell's collodion, of late I have not seen a single marking, and, in order to prepare a specimen of this defect to submit to your notice, it became absolutely necessary for me to prepare a collodion on purpose, and, as you see, my success has been very great, for the plate now handed round is one of the worst cases of this kind of marking that can possibly occur.

The remedy is here, as in the last case, to use a porous film; for however carefully you may wash your plate, whether in four drachms, one ounce, or four ounces, on applying the albumen to a plate coated with a compact film, these defects will at once form, and, on the plate becoming dry, be very apparent.

Fogging occurs in the 'dry process' in a somewhat similar manner to the same appearance in the 'wet,' and may arise from the state of the bath, over-exposure, diffused light, excessive heat, vapours or gases in the operating room, &c.

It is sometimes found that a bath solution, after being used to excite a number of plates, will yield foggy pictures, although, on testing the fluid, it is sightly, and as at first, of the proper strength.

How to proceed here is a difficulty not easily overcome. The only plan likely to be successful is to add carbonate of soda until an alkaline reaction is produced, then to filter, and render the filtered liquid slightly acid by acetic acid; should this fail, making a new bath will save both your patience and your pocket.

Over-exposure is sometimes the cause of fogging, especially when the temperature is high. Here our course of action is apparent. Excessive temperature in the operating room will often give rise to fogging, and it is one of the many difficulties met with in a hot climate. Still with care we may prevent it, by diluting the collodion with one part alcohol and two parts ether, by an increase in the amount of washing the film after exciting, and by diluting the albumen mixture with one-third and the developing solution with an equal bulk of water.

Diffused light in the operating-room is certain to cause "fogging." To test if the operating room is sufficiently free from actinic light, expose an unwashed and excited plate in the room, near the source of light, for eight or ten minutes, then pour on the developing solution for half a minute, wash, and fix with hypo. Should the room admit no actinic light, and the bath be in good condition, the plate will be quite transparent; but if a foggy deposit has taken place, the room or the bath is at fault, and, if the former, an increased thickness of yellow calico or another pane of yellow glass must be used.

The vapour of ammonia or sulphuretted hydrogen in the operating room is often the cause of fogging.

and must at all times be most carefully guarded against.

Want of Intensity.—This may arise from many causes. The most frequent in Fothergill's process are,—defective bath, too much washing after the exciting bath, and over-exposure.

A defective bath often gives rise to a want of intensity, due to an unknown change which sometimes takes place in the bath solution; and as no remedy is at present known, the employment of a new bath is the only chance of success.

Too much washing after exciting often gives rise to a want of intensity in the resulting negative, more especially if the collodion employed yields a compact film, and for this reason it also appears advisable to use a porous film, heavily charged with iodide. An excited plate, stereoscopic size, coated with Powell's collodion, is, I find, sufficiently washed with 6 drachms of water, whereas a compact film requires a much larger quantity, and there is more danger of the washing being carried too far.

Insensitiveness.—This fatal difficulty arises from the employment of a very acid or unsuitable collodion. The bath should contain (as before stated) 40 grains of nitrate of silver, and give a very slight acid reaction to test paper. To avoid "insensitiveness," or want of uniform sensibility, I adopt the following plan:—Supposing two dozen plates of first-rate quality were required. We should here require at least 4 ounces of iodized collodion and 24 ounces of bath solution, and test these by taking a view near the operating room, by the "wet process"; if these worked satisfactorily, fill the bath (holding, say 12 ozs.) with bath solution, and pour off 2 ozs. of the iodized collodion into a clean 4-oz. bottle, and use this to coat and excite the plates; then add to the remainder of the 2 ounces of collodion about 20 drops of ether (more or less according to temperature), and coat and excite six more plates. Having coated and excited these twelve plates with the 2 ounces of collodion and 12 ounces of bath solution, it is advisable to turn out the collodion and bath solution into stock bottles for further use after being tested, and to coat the second dozen of plates with another 2 ounces of collodion, and excite them in a fresh quantity of bath solution, of course taking care to add a small quantity of ether to the collodion, after coating six plates as before.

This plan ensures uniformity, and is not more expensive in the end than if we attempt to economise by using a limited supply of collodion and bath solution, as the collodion and bath solution may be again used, the former after being slightly diluted with ether, and the latter after being strengthened if needed.

Stripping off of the Film.—It sometimes happens, on fixing a negative by many of the dry processes, that the film becomes detached from the glass, and slips off in washing. To avoid this, take a small-sized camel's-hair pencil, and tie it to a thin slip of wood, so that the latter may project about a quarter of an inch below the brush. Dip the brush so prepared into your bottle of negative varnish, and then, holding it upright, and using the projecting slip of wood as a guide, carry the brush round the four edges of the plate, so as to leave a film of varnish about one-eighth of an inch all round.

This brush requires to be kept in a separate bottle containing a little alcohol, in order to prevent the varnish on it becoming hard and dry, and thus rendering it unfit for use.

The film of Fothergill's plates sometimes peels up at the edge on the final drying before varnishing, and as this defect often accompanies a good collodion, we must prevent it by an extra roughening of the edges of the glass with a corundum file [the instrument was here exhibited], and when the plate is dry after exciting, varnish around the edges as before described.

Pin-holes in the Skies.—These minute holes sometimes exist to such an extent as to spoil an otherwise good negative, and may be prevented by fully saturating the bath solution with iodide of silver, and avoiding a collodion iodized with impure iodide of potassium, and using very carefully filtered developing solutions.

Mr. Ackland resumed his seat amidst expressions of applause.

The President rose to thank Mr. Ackland for so very useful a paper. He had been pleased to hear of difficulties rather than impossibilities, and to know that the defects were not without remedies. The specimens of the various defects which the Vice-President had provided to illustrate his remarks, were, he thought, wisely produced, inasmuch as, being seen, they would be more readily recognized at any future time by amateurs in the dry process, when the remedies and precautions Mr. Ackland suggested would doubtless prove of great service. To know an enemy was a good way towards vanquishing him. Having run over the memoranda he had taken, to give in one view the character, &c., of the various difficulties, the hon. gentleman said the references which had been made to some of the photographic publications proved their great value; and concluded by awarding to Mr. Ackland the usual vote of thanks.

Mr. F. Howard: Mr. Ackland's paper was, in his opinion, an invaluable one, pointing out, as it did, means of removing the many difficulties which beset the dry collodion worker. He would venture to make a few remarks. First, with regard to blistering, he would state that, judging by his own experience, it proceeded invariably (he practised Fothergill's, and not the collodio-albumen process) from using the glass when it was not perfectly dry. He would therefore advise operators not to be content with merely cleaning their plates well before using, as, after being put by, they required friction (or warming), to remove what he might term an imperceptible moisture, which glass was apt to retain, even when kept in a dry room. The breathing upon the glass ought always to be succeeded by brisk rubbing, as a means of warming the plate. As regards water-markings, which were among the greatest obstacles to successful results in Fothergill's process, he had succeeded in entirely removing them. He had found, in the course of numerous experiments with various collodions, that these markings invariably occurred with greater distinctness on one half of his stereoscopic plates than the other, and that that half was the one over which the albumen last travelled. It then occurred to him that the albumen, when applied after washing the plate, had sufficient density to push all moisture before it to a certain point about two-thirds the length of the plate, when, becoming diluted and no longer able to assert its supremacy from that point, an uneven coating was formed and the markings began. To avoid them he proceeded in the following manner:—After the plate had been removed from the bath, washed, and drained for half a minute, he applied the albumen along the long edge of the plate, allowing it to travel slowly right across. It thus had only $3\frac{1}{4}$ ins. to pass over instead of $6\frac{3}{4}$ ins., and he found that by so doing he overcame the annoyance. Mr. Howard also stated that he could produce good pictures with any good negative collodion, want of sensitiveness being the only drawback to the use of such as were not specially prepared for the dry process. With regard to the splitting of the film after fixing, it was caused, he thought, by drying too quickly in a current of air or near a fire. Washing off he prevented by running round the edge after drying, and before exposure, a brush dipped in albumen. He

would advise practical workers of the Fothergill process not to discard a good negative collodion simply because it was not prepared for the purpose. If a good wet negative could be got by the collodion and bath, a good dry one, with careful manipulation, could be likewise ensured.

Mr. Smith made some remarks regarding the use of gutta-percha baths.

Mr. Hannaford remarked, that one reason for the blistering which occurred in the collodio-albumen process was, that the albumen and collodion films expanded in different degrees on being covered with the developer. Great care should also be used in the selection of collodion. Coating the plate entirely with albumen before applying collodion would prevent non-adhesiveness, and also to some extent blistering. Water-markings, &c., in the Fothergill process arose most frequently, in his opinion, from not using the albumen sufficiently diluted; he found the white of an egg, in half a pint of water quite enough. Marbling from careless development would be to a great extent prevented, if the plan suggested by Mr. Burnett should be found to answer. He should allude to it in a jotting he had prepared for this evening, which, as it related to the subject under discussion, he might be permitted to read. Mr. Hannaford then read as follows:—

I am of opinion that the great want of success in employing dry plates is in carelessly washing them. The following plan I like best of all I have tried:— The collodion should contain a bromide, and, perhaps, a chloride, in addition to an iodide, for reasons which will presently be seen. The plate, after sensitizing, is dipped into a pan of water, and moved about so as to remove *and save* the greater part of the free nitrate of silver, and afterwards washed in an unlimited quantity of water under the tap. It is then coated with the following, and washed as before:—

Water	half a pint.
White of one egg	quantities immaterial.
Iodide of potassium	
Bromide of potassium ...	
Chloride of potassium ...	

The plates in this state are quite insensitive to light, and will keep any length of time. The operation, so far, may be conducted in broad daylight—a great boon for those who have not an unlimited supply of water in their operating room. To sensitize the plates, immerse them in a very weak silver solution—the first washing, for instance—or re-dip in the silver bath and thoroughly wash. So far this is only a modification of the collodio-albumen process, in which there is nothing new. The plates in this state will not keep any length of time. This is owing to the presence of free nitrate of silver; for to be sensitive the plates must have a considerable quantity of free silver present, but it need not be the *nitrate* or any other soluble salt. Bromide, chloride, acetate, citrate, oxalate, &c., answer equally well, as regards sensitiveness, and far better as regards keeping qualities, and therefore it will be found that, by immersing the sensitized plates in dilute acetate of soda or chloride of sodium, and afterwards washing them, we are enabled, without risk, to have much more silver on them than when it is in the form of a soluble salt.

Mr. Martin would ask Mr. Hannaford what he considered thorough washing?

Mr. Hannaford.—Placing the plate under the kitchen tap.

Mr. Martin.—Then you rely for free nitrate of silver on that which is mechanically retained in the film, and which washing will not remove?

Mr. Hannaford.—No. I have stated that there need be *no free nitrate of silver* on the plate. It is only necessary that there should be some other silver salt present besides the iodide, and this I have taken care to secure. For bromide and chloride of silver are obtained in the film, whilst the albuminate and acetate are formed in the after-operations.

After some further discussion, in which Messrs. Wall, Hervé, Hannaford, Leake, Howard, and the President took part,

The President called upon Mr. Hannaford for his promised paper.

Mr. Hannaford said—As there are very many matters constantly recurring in every one's photographic experience, which, without being of sufficient consequence to form one entire paper, are yet worthy of being jotted down, I bring you the first instalment of a series of short papers to be introduced from time to time by one or another member under the head of "Photographic Jottings." The first I will offer is upon "Carbon Printing."

M. Asser, of Amsterdam, has recently published a process of printing in lithographic ink. I will shortly state it, for the benefit of those who may not have read his instructions. He coats paper unsized, or sized by starch, with a solution of bichromate of potassa, exposes it when dry under a negative, and fixes the picture by washing in water. After heating it on a piece of hot marble with a flat iron, he saturates the paper with water, and passes a roller charged with printing ink over it. Now, the reduced bichromate on the paper is found to have an affinity for grease, whereas water, of course, repels it; consequently the ink from the roller adheres only to the bichromate, thus forming the picture.

Mr. Shadbolt, in his Journal of the 15th inst., in noticing this process, states that he has for some time entertained a scheme founded upon one of the photolithographic processes. In substance, it is the same as that of M. Asser.

I have not had time, since the publication, to try either of the above, but I will give you the result of some experiments I made last year in a similar direction.

Mr. Sutton once stated that if a piece of paper be coated with gelatine, and a roller charged with printing ink passed over it, on after-immersion in water the whole of the ink would come off and the paper appear quite clear. Acting on this hint, I took a sheet prepared for iron printing, that is, coated with bichromate of potassa, ammonia, acetate of iron, and albumen—(I employed this because I had it by me)—and after exposure under the negative, gave it a coating of printing ink before fixing in water. But although I succeeded in getting the high lights perfectly clean, and, indeed, produced a very fair copy of an engraving, I could not manage the half-tones. A little perseverance might have overcome the difficulty, and I purpose renewing my experiments. In a second case, instead of ink I used plumbago, blackening the paper with it after exposure, but was not over-successful. The following plan answered better:— The sensitizing mixture had sufficient albumen, gelatine, or gum with it to give a glaze when dry. Exposing and fixing in water, as before described, I obtained a print sized in the parts which had come under the influence of light, but unsized in those portions protected from it. When dry, it was coated with plumbago by the help of a soft stump. Holding before the steam from a kettle caused the size to retain the blacklead in contact with it, whereas the whites being perfectly unsized, the plumbago was easily removed therefrom by using stale bread; friction is, however, objectionable.

I will now offer a few suggestions respecting the above process of M. Asser. In the first place, it will require delicate handling, to say the least, to pass an inked roller over plain paper saturated with water, so that no ink may adhere to it. Perhaps first soaking it in strong alkali, so as to remove any substance having

an affinity for grease, would be an advantage. Finger-marks, for instance, might be imperceptible to the eye, but they would show as soon as they came in contact with the ink. This difficulty, if indeed it proves one practically, would refer more to Mr. Shadbolt's process than to that of M. Asser; for the latter surface-sizes his paper with starch, which appears a matter of some importance. If used very thick, so as to form a crust on the paper, it would have more the properties of photographic stone.

The graduated drawing-boards, sold by artists' colourmen, have surface of body-colour which might render them of use in this process; they may be procured plain, of a very light colour.

One hint more, and I have done with the subject for the present. Lithographic printers are in the habit of mixing pure gum-arabic with the water to keep the stone damp, as it is found to repel grease much more completely than water alone. It might be advantageous to add gum, and, perhaps, a little nitric acid to the water with which the paper is kept saturated whilst being inked.

Photo-Engraving.—As hints on this subject are always acceptable, I give the following very rough jotting of a process by which, I think, something may be done:—Last spring I coated a steel plate with the iron solution used in my iron-printing process; bichromate of potassa and gelatine answer the same purpose; the exposed plate was immersed in nitrate of silver, when chromate of silver was found on the parts which had not been acted on by light. The plate could now be bitten into by acids—hydrochloric for instance. If, instead of steel, a copper plate be used, and after immersing in the silver it be washed, so as to remove the film, an impression is obtained resembling a daguerreotype, reduced silver giving the shadows, and the unaltered copper the lights.

Mr. Howard.—As regards the want of half-tones in the method of carbon printing alluded to by Mr. Hannaford, having had considerable lithographic experience, he could say that half-tones were not to be produced on a smooth surface, (if you pass the lithographic roller over any smooth surface, the ink must adhere to all parts in a uniform manner); that it was necessary in lithography, if you wanted half-tones, to have a roughened or granulated surface, as the ink then only adhered to the projecting and prominent portions, forming a series of irregular dots.

Mr. Wall would venture to put forward a singular fact as another "jotting," which in these days, when photographic portraits are received in our courts of law as evidence to prove identity, might not be unimportant, although he would not for an instant infer that such evidence should be doubted. The two photographic portraits he now placed before them were beyond doubt of two perfectly different men, and yet they were so alike that he had much difficulty of convincing many of the fact.

Mr. Leake said, although the hour of adjournment had already come and gone, he would, with permission, detain the Meeting a few minutes longer, as he had a communication to make which might prove important. He had been much annoyed by a new sample of glass (patent plate) called German. His usual cleaning solution, consisting of cyanide of potassium and tripoli, had not the least effect; and another plate-cleaning solution, warranted to clean anything, was equally impotent. Both these solutions were perfectly effective with other glasses. He found also that the exposure was, with this glass, much longer. A deposit made its appearance between the glasses and the collodion during development, and the picture produced was misty and full of stains. Moreover, after drying, the film in most instances split off from the plate. He had tried experiments with the same cleaning solution, bath, and developer, on the same day, using other glasses with excellent results.

Mr. Wall said he understood that there was a large and increasing demand for the glass in question; the wholesale houses were buying largely. In his own establishment they had willingly purchased, for it was cheaper, and, to all appearance, better than they had previously obtained. The matter therefore was one of importance. As he had witnessed Mr. Leake's experiments, he could vouch for their accuracy.

Mr. Hervé stated that he once met with similar difficulties from purchasing a glass called in the trade "jam glass," and made in Germany. He attributed it to the presence of lead in the formation of the glass.

The President suggested an experiment to test the specific gravity of various specimens with reference to their photographic qualities, and then announced for the next meeting on Thursday, December 15th, a paper entitled "Practical Observations upon Photographic Productions in their relation to Art," by Alfred H. Wall, Hon. Sec.

Five new Members were elected.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

Remedy for the Browning of Prints.

To the Editor of the Photographic Journal.

Bagnères de Bigorre,
4th December, 1859.

Sir,—All photographers, of even the shortest experience, must be but too well aware of the annoyance which is frequently met with, when, having prepared a large stock of positive paper, a series of wet and dull days intervenes, and the paper turns brown, and spoils, before it can be printed off. Prints made on such paper, and fixed as usual, never possess the *éclat* of those printed on fresher paper, while the paper, becoming less sensitive from age, and requiring a longer time of exposure to print it, is further browned during the printing, and the evil still more exaggerated. Such pictures, examined by transparence, look dull and granular in the whites, through a deposit of some compound of silver in the web of the paper, which I suspect to arise chiefly from the decomposition of the resinous soap used in the size,—not alone from albumen. Whatever this compound may really be, it appears particularly

in some qualities of paper rather than others; and during the hot weather of last summer I was so annoyed by it, that for some months I found it next to impossible to produce any number of really presentable pictures at a time. Necessity in due course resulted in the discovery of a remedy, and I think I can now offer you a formula for a bath by which to whiten the brown parts of such prints. When a batch of proofs have been printed, washed, and dried, they should be sorted over, and any such that are as above described put aside for treatment with the following bath. Take of

Solution of perchloride of iron* 1 fluid oz.
Strong hydrochloric acid .... 2 fluid ozs.
Nitric acid, sp. gr. 1·4 ...... ½ fluid oz.
Mix water .... 3 quarts.

Plunge the proofs into this solution, keeping them moving all the time, and they will be seen rapidly to bleach in the white parts. As soon as the desired result is obtained, the proof should be removed from the bath, and, having been washed in pure water, it may be passed into a weak hypo bath of not more than 4 to 5 per cent. The subsequent washing to get rid of the hypo is afterwards to be proceeded with as usual. In order to ensure the complete abstraction of all the acid from the paper before placing it in the bath of hypo, enough finely-powdered chalk or whiting to produce milkiness may be mixed up in the last washing water; but the pictures should be passed through two or three waters at least, beforehand, so as to get rid as far as possible of all the iron salt.

The above mixture is not by any means the only one which will effect the purpose, since chloride of lime solution (bleaching liquid) will do, except that by its alkalinity it acts on, and dissolves albumen and the size of the paper, making the latter very tender to wash. Chloride of copper also answers well; and Legray's acid bath of chloride of gold, but it is expensive, and gives the proof a cold, grey tone; many other salts also: but I have chosen the perchloride of iron on account of the property it possesses of coagulating albumen, and retaining the tenacity of the paper, while its action is not too energetic on the dark parts of the proof. Under all circumstances, however, the above bath acts on the whole picture, lightening the dark parts and etching them back. Such brown sheets should therefore be rather over-printed, if intended to be treated as above described.

F. Maxwell Lyte.

* Tinctura ferri sesquichloridi of the London Pharmacopœia.

Mr. Shadbolt on "Swinging-Back" Cameras.

To the Editor of the Photographic Journal.

Nov. 5, 1859.

Sir,—I shall feel obliged if you can find space in your next issue for Mr. Shadbolt's annexed article on "the swinging back" (or any portion of it), and my reply thereto, of which the following is a copy:—

"In a letter which appeared in the last number of the *Journal of the Photographic Society*, from the pen of Mr. N. Ennel, a gentleman who has displayed considerable ingenuity in devising several useful mechanical contrivances connected with photographic apparatus, we find him asserting that the use of a swinging back to a camera, or any equivalent thereto, is 'wrong in principle,' and in corroboration cites 'a simple experiment with the common burning-glass held between the sun and a cardboard. If the common axis of the sun and lens do not intersect the plane of the cardboard *perpendicularly*, the image of the sun is thereon represented *elliptically*.' He then goes on: 'Substituting landscape, &c. and focusing-screen for sun and cardboard, we arrive at the same result: we may, indeed, get most points in good focus, *i.e.* *distinct*; but *every one* point will be distorted.'

"As we cannot assent to the premises, of course it is not at all surprising that we do not agree with the conclusions; but setting aside for the moment the question whether the use of a swinging-back camera is wrong or not in principle, we would ask for a nicer definition of what he means to be understood by asserting that *every point is distorted*? We are almost tempted to fancy, from the experiment he has quoted, that he is not quite familiar with the conditions under which advocates of the 'swinging back' recommend its use. The sun subtends but a very small angle of vision; and, such as it is, the two opposed limbs are not at any appreciable difference of distance from the spectator; consequently in substituting the equivalents in a landscape subject, we should define it as a small window immediately in front of and not very close to the operator. Certainly this is not a subject requiring the aid of a swinging back, which like all other things can be misapplied. Mr. Ennel must select some happier illustration to uphold his argument: let him try to focus one side of a street or lane disposed very obliquely towards him, and he may alter his opinion.

"With regard to the charge of *distortion*, Mr. Ennel must mean something different to what is usually understood, the latter being a quality due to the *lens* and not to the swinging back. By inclining the plane receiving the image from a lens, the *scales* upon which the

objects on opposite sides of the axis are depicted differ somewhat it is true. If this be what he intends by *distortion*, the error is one of degree only, for the same thing occurs to a less extent, even when the axis of the lens is perpendicular to the plane of delineation, in which case objects situated at the margin are depicted upon a slightly larger scale than those in the centre.

"We feel no hesitation in alluding to Mr. Ennel's remarks, being assured that he is only, like ourself, animated by a desire to advocate that which he regards as sound in principle. We shall be most happy to discuss the matter with him."

"Nov. 4, 1859.

"MY DEAR SIR,—I have to thank you for No. 99 of your valuable Journal, this morning received. I found in it (p. 184) the article you mentioned to me on Tuesday last, alleging it to deny the correctness of my observations in the *Journal of the Photographic Society*, with regard to the swing back. I truly regret that I was ignorant of this article, or I would have replied to it immediately.

"I must confess I feel rather puzzled to know how to shape the course of the argument, after so clever a feint of yours in knocking down my premises like ninepins, without saying why: you merely *cannot* assent to the premises, nor, of course, to the conclusion.

"Suppose we put the case in the form of a syllogism:—

"All circles projected on an inclined plane are ellipses*.—(*Maj. prem.*)

"The back of a camera not parallel with the front is an inclined plane.—(*Min. prem.*)

"Therefore every image produced on the swing back is distorted.—(*Conclusion.*)

"Can you detect here any fallacy?

"But I must not forget; you ask for a *nicer* definition of '*every point*' and of '*distortion*.' I thought these terms plain enough, and had not given any definition; but in deference to you, who think otherwise, I will say that by *points* I do not mean mathematical points, but visible forms with certain proportions, as perceived naturally and in conformity with certain laws of perspective; and by *distortion* I understand a false representation of these forms, *i.e.* a representation in which the relative proportions differ from those of the original. These definitions, I trust, you will not find dogmatical, seeing that I use the terms not in a particular but general sense, and in the common acceptation of the words. *Distortion* must not be attributed to a medium only, but be acknowledged wheresoever found, without reference to its cause, which may be, as in the case before us, the disturbance of the parallelism between lens and back.

* Being transverse sections of a cylinder that are not perpendicular to the axis.

"Having cleared the way thus far, I will proceed to show that, in spite of yourself, you have, in fact, assented to my proposition.

"You admit that in the case of a small distant window the swinging back would be *misapplied*. Why? Because the window would be misrepresented; instead of appearing, *e. g.*, a square or a circle, it would be an oblong or an ellipse. Pray hold this fast. Let this little distant window be in a high tower, or in one of the houses on one side of the street; focus it. The swing back here, by your own admission, would be *misapplied*. Now you want to bring also into focus the more distant windows, and likewise the nearer ones of the tower or street; you swing the back, and at the same time you have distorted, at all events, *that little window you first focused*. Now you cannot surely admit this—as you must do, and as you have done—and not the corollary, that the next window and the next to that, &c., are distorted! Or, imagine the whole tower or the whole side of the street one large window. If the proportions (or, as you say, the *scales*) of a *small* window are not truly represented on the inclined plane, the disproportion of the large window must only be all the more obvious. In a word, your high tower and every detail of it will appear too *high*, your street too *long*, and every house in it, and details, too wide in proportion.

"But you go even further; you grant that '*the scales differing is an error*, but only an error of degree.' Now, really, is not, in a scientific point of view, '*error*' synonymous with '*wrong in principle*'?

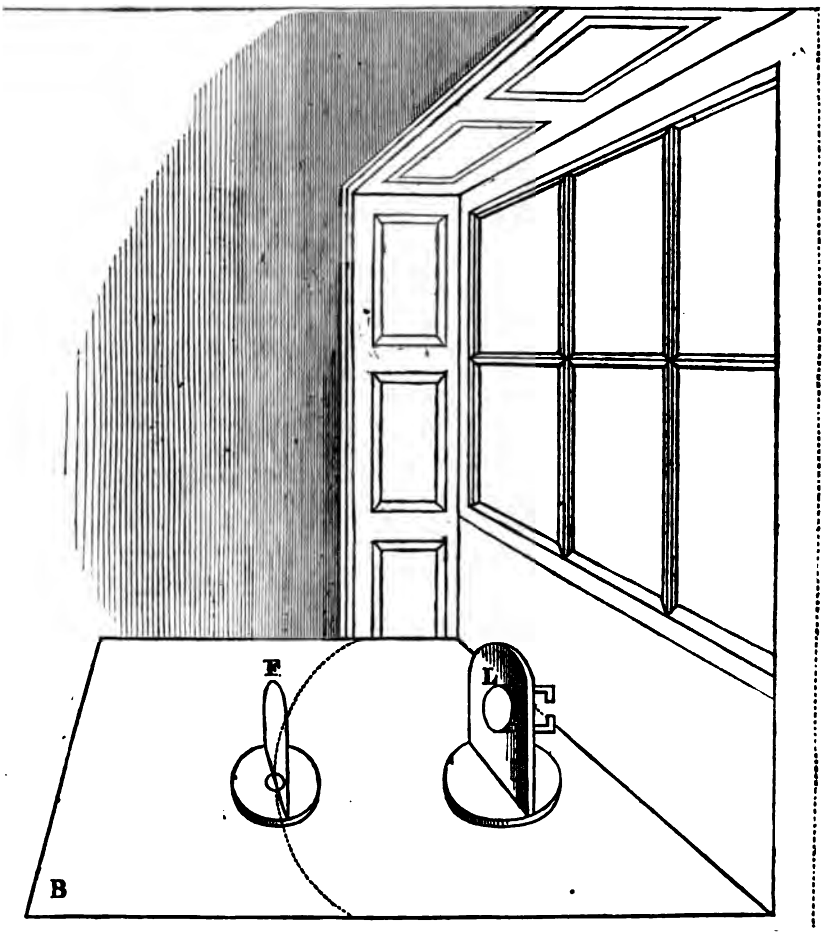
"N. ENNEL."

The Field of a Lens by Observation.

To the Editor of the Photographic Journal.

SIR,—The field of a photographic lens is understood to be the surface of the images formed behind a lens presented to distant objects, and would be assigned by giving the locus of images found in the primary plane. A very little observation will show that different lenses possess very dissimilar powers in reproducing the images corresponding to a landscape; the form of lens, and the size or position of stop, are evidently concerned in producing the effects that are observable. Now, though the above definition is not the most scientific that could be found, yet it indicates pretty clearly what is meant to be expressed, and appears

simple enough; but, notwithstanding its apparent simplicity, the actual determination of the form of the field of a lens or compound lens by a calculation for any particular case is by no means so simple an operation. As far as I know, we are under the necessity of computing the lengths of the foci for a series of pencils of rays coming from distant objects. These pencils, taken collectively, form a cone of rays whose position in reference to the lens has to be prescribed: that is to say, the point of convergence of these rays or small pencils has to be put at some given distance from the lens; and, supposing this cone to embrace 60°, half of this would be 30°; and, if every third degree were thought sufficient to compute the focus for in obtaining the field, in this view of the case we should require ten distinct calculations before we could arrive at a very accurate solution of the case. But this is not all: the oblique pencils have not the same exactness of focus as the central ones, the focus of an oblique pencil is known to be a series of foci, and is not exactly at this point nor that point, but lays between two points at different distances from the lens, called the primary and secondary focus belonging to the pencil. This indeterminate character about the focus, persons may sometimes observe at the extreme margin of their picture, where perpendicular railings sometimes have not exactly the same focus as the connecting horizontal bar; hence, if we require a very accurate determination, we have actually to compute two series of foci, viz. the primary and secondary, and then to take a certain line between them as the ultimatum. It is not surprising then, that, where this information is required for several



lenses, experiment is resorted to to obtain the form of field resulting from certain lenses under a prescribed position of stop, in preference to the rather long process necessary to obtain it theoretically.

I will now proceed to describe the apparatus

I found convenient in graphically tracing the field. It consists, as the diagram illustrates, of a level board B, placed firmly close to a window where the means of darkening with a curtain or otherwise exists, so that a little moveable frame containing the tube and lens L, can be exposed to the landscape. The focusing-glass F is moveable, and consists of a circular metal plate about 3 inches in diameter, perforated in the centre to ¼ or ½ inch diameter, for the purpose of allowing room to make a short stroke with a black-lead pencil, on the paper attached to the board, every time the focus has been observed. On this circular metal basis is attached a piece of greyed glass, exactly upright, and whose greyed surface bisects the aperture or opening in the plate: the upper corners of the greyed glass should be taken off and rounded, and the edges covered with a strip of velvet or pasteboard. It is now evident that, whenever it is desired to note the position of the focusing-screen F, nothing more is required than, with a fine-pointed pencil, to draw a short line in the opening, the pencil leaning against the lower edge of the ground glass as a ruler.

The window being open and the board fixed, the lens is screwed into the frame, and placed opposite an opening in the darkening medium: this should be of a more substantial nature than a light curtain; otherwise, if there is any wind, it might put an end to the experiment before the observer was well ready to begin. Two or three sheets of the largest brown paper, pasted together, will suffice for every purpose, the upper portion of the window being darkened by a curtain. This being arranged, the focusing-screen is moved until the images of the distant objects are clearly defined on its surface, this being proved by looking from behind the screen in the usual way, using a magnifier, if necessary—or it might be viewed in front on a piece of white card; then, with a pencil, a mark is made through the perforated metal plate on the paper below; the focusing-screen is then moved ⅛ or ¼ of an inch at a time, and another observation taken and recorded on the paper below. In this manner, after a sufficient number of marks have been made, the field will be graphically produced on the paper. It is proper, of course, while this is in progress, that the lens-frame be not moved in any way; it will be as well then to note the principal focus of the lens, measured with a suitable rule from the surface of the lens to the dotted tract or focusing-screen; the diameter and form of the lens, and distance of stop, may likewise be noted on the sheet of paper at the same time.

In this manner the field was graphically delineated for the several subjoined lenses, and, after being taken, then compared with a number of cardboard circular gauges, and the cardboard gauge that appeared most nearly to correspond with the marked field on each paper taken as the radius of the field, each gauge being marked with the radius it had been cut to. This process only admits of a certain moderate degree of accuracy, but amply sufficient to obtain useful results, and show the dissimilar fields obtained with different lenses, not greatly differing in focus, each having the same diameter and same distance of stop as far as observation No. 7.

The first four lenses were 2¼ inches in diameter, and were unconnected single lenses having the stop 1⅛ inch in front of the shallowest surface, when the tube containing the lens and stop was reversed, so as to present the convex side of the lens to the landscape, with the stop consequently behind it; the field was in each case more concave than in the regular position, as noted below:—No. 1, a plano-convex lens of 6·3 inches radii; No. 2, a meniscus of 4·2 by 14 inches radii; No. 3, a meniscus of 2·85 by 4·9 inches radii, and No. 4, a meniscus of 2·5 by 4·2 inches radii. The results for these were:—

No. 1, 12⅛	in. focus,	9	in. radius of field.
No. 2, 12	,,	14	,, ,,
No. 3, 13	,,	30	,, ,,
No. 4, 11½	,,	24	,, ,,

The following three lenses were achromatic meniscuses, also 2¼ inches diameter, with the stop 1⅛ inch in front, not as being the best distance, but in order to compare with the preceding:—No. 5, an achromatic meniscus whose exterior curves where related as 1 to 5; No. 6, one whose radii were as 1 to 4; No. 7, one whose radii were in the deep ratio of 1 to 2 nearly.

No. 5, 13¾	in. focus,	15	in. radius of field.
No. 6, 14½	,,	15	,, ,,
No. 7, 14½	,,	48	,, ,,

The next lens examined was a combination after the Petzval or Orthoscopic construction, a form, by the way, admitting of great power and quality of definition: in No. 8, the lenses were separated ⅜ inch; and in No. 9, the same lenses, but separated 1⅝ inch. The definition at the margin and generally, in No. 8, exceeded that in No. 9.

No. 8, 16	in. focus,	17 in. radius of field.
No. 9, 13	,,	and having a flat field.

The next lens submitted was a No. 1 Sutton's symmetrical triplet, having two plano-convex achromatic lenses of 10 inches focus, with a

concave lens in the centre between them, viz. No. 10 having a concave lens of 14 inches focus, and No. 11 having one of 10 inches focus, taking the focus from the centre of combination.

No. 10, $8\frac{1}{2}$ in. focus, 13 in. radius of field.
No. 11, $10\frac{1}{4}$ „ 65 „ „

The following lens, No. 12, was our newly-arranged Double Periscopic, in some respects resembling a suggestion of Mr. J. Brown of Newcastle-on-Tyne, but the freedom of which from distortion, and general features, only arise out of a pretty close management of the radii of two periscopic but unsymmetrical lenses, placed close together, with the convex sides outwards.

No. 12, 14 in. focus, 24 in. radius of field.

It may be observed that in the whole of the above observations there has not occurred a field that was convex to the lens; notwithstanding, this circumstance does occur in some special cases. In a letter that I sent to the 'Journal' for September 1858, after giving a diagram of a special case, where a convex field arose, I ventured to make a more general application of the fact than I should have done; however, the reader will perceive I have given him now a small collection of observations nearer to the ordinary cases to be met with.

I may remark in conclusion, that, should any photographer be surprised or bewildered at the number of optical productions now appearing in the advertising sheets, he may console himself by the reflection that they are at least less than the photographical processes, and the fact merely shows a healthy state of activity in providing for the exigencies and important applications of the infant science.

J. T. Goddard.

Comparative Value of the New and the Old Lenses.

To the Editor of the Photographic Journal.

Sir,—I am glad to see that the trial of the comparative value of the new lenses against the old, to which I called attention in a late number of the Journal, has at length engaged the attention (although individually) of photographers; and Mr. Fenton, than whom no one is more competent, has pronounced an opinion upon one, namely the Orthographic for landscape purposes. As I have been lately making some trials of this same lens for copying maps, and no one since the death of poor Howlett has sent any communication to the Journal detailing any experiments in this direction, I am induced to send you the results I have arrived at. The Orthographic Lens I had for trial was supposed to cover at least 8×10 ins., was $1\frac{3}{4}$ in. diameter in the front lens and 1 in. in the back one, and had a focus of about 18 ins. I compared this lens with two others by Ross, namely a very fine $3\frac{1}{4}$-in. portrait of 10 ins. focus, and a 3-in. landscape of 15 ins. focus. The map that I set up to experiment on was an Admiralty chart 40 ins. wide, and I copied it to the following scales:—1st, the whole width of 40 ins. reduced to the plate of 10 ins.; 2nd, half the width on the same sized plate; and lastly, one quarter the width, or 10 ins., on the plate, being therefore the same size as the original: for all practical purposes I found the first and last quite sufficient.

Experiment with the Portrait Ross.—Lines perfectly straight. Stop required to give a flat field $\frac{3}{4}$ in. in front of lens; comparative time of exposure 1 min. Light to edge of plate perfect, on same sized scale; and shading off with a slight loss, $\frac{3}{4}$ in. on each side of plate, on the $\frac{1}{4}$ scale. The field was as nearly perfect as possible, not more than $\frac{1}{4}$ in. on each side of plate being slightly out of focus, and, if a little allowance is given to the centre, it is not perceived at all.

Experiment with the Landscape.—Lines not straight, curved inwards from the centre to edge of plate full $\frac{1}{8}$ in. Stop required $\frac{1}{2}$ in. Field quite flat. Time of exposure 3 mins. Light to edge of plate perfect.

New Orthographic Lens.—Lines as nearly straight as possible; about half an inch from each end rather abruptly turn outwards, but the remainder could not be perceived with a straight edge. The straps did not appear to be of much use in flattening the field. I selected, however, the No. 2 or $\frac{1}{2}$-in. (the same size as I used with the landscape lens). I was very much surprised to find that this lens for copying covers barely more than 8 ins., that no amount of focusing would give the extreme edges sharp (the last $\frac{1}{2}$ in. on each side appearing to have no focus at all), and, from the great focal length, would require a great length of camera to copy the same size. Light extremely good all over the plate. Length of exposure fully half as long again as landscape lens—about 5 mins.

From these experiments, which I carefully carried out with every precaution, squaring the map opposite the lens by a string from the centre, and not depending upon one trial only, I have come to the conclusion that, for the present, no lens can beat a good double Portrait Combination, stopped down, for copying maps. I hope, however, some of these days to try the new lens of Sutton's, and also the single lens of Grubb's, when I shall be most happy to send you the results, whether these lenses are of any use in this direction, and whether they will compete with my Double Ross.

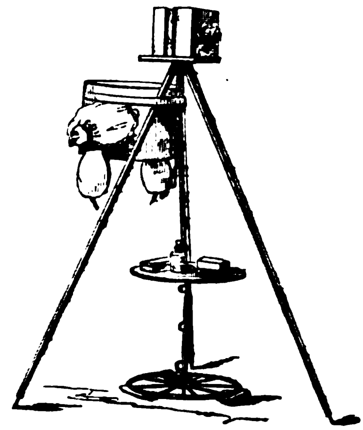
Francis G. Eliot.

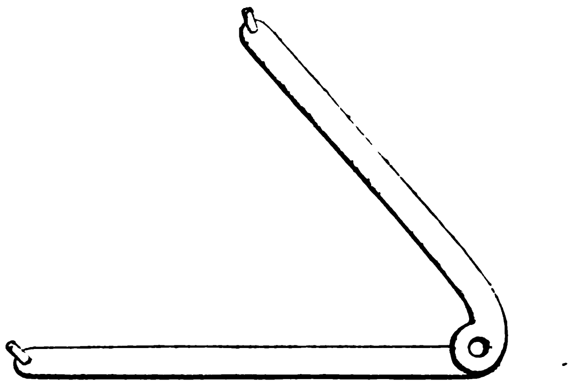
Description of a new Field-box.

To the Editor of the Photographic Journal.

Sidmouth, October 24, 1859.

SIR,—I herewith forward photographs of a field box, which, on account of its simplicity and cheapness, may be of service to some of the readers of the Photographic Journal, if you should think the description worthy of insertion in your periodical. The box itself is merely a strong, full-sized *chip band*-box, covered with black linen, having holes and sleeves for the hands as usual, and a glass pane in front covered with *yellow paper*. In the lid is a piece of orange glass for watching the development of the picture. I have prevented the annoyance arising from the condensation of the breath on this glass, by covering it with a very thin film of soap. Pieces of card-board, hinged with cloth, serve to close all the apertures for packing. The box itself is packing-case for camera, chemicals, and water, for which latter I find nothing to occupy so little room as three or four flat square powder-canisters. Two very light wheels are attached to an axle on which are fixed three sockets. In these sockets the ends of the camera-legs are inserted, and fastened by pins. To the legs





Rule-joint.

the box is strapped, and by them the apparatus is wheeled from place to place, nothing *extra* being thus required. The wheels placed on end (as in photograph) with a piece of oil floor-cloth fitted on the top, serve as a table. When in use, the box is supported on a light iron rule-joint, fixed to the camera-legs by sockets. The ends of the rule-joint inserted into these sockets are cylindrical, and thus with the rule-joint itself allow the free opening of the camera legs: a strap fastens round the box at the top, and two of the legs. A bullet suspended under the centre of the camera beats seconds, and a piece of black linen thrown over the head of the operator while working, excludes all stray light.

N. S. HEINEKEN.

P.S.—I would suggest the use of fluoric acid gas for the production of grey glass for the camera, instead of the very troublesome (and often worse) grinding with emery.

In the photograph of the wheels as a table,

I have inadvertently not allowed sufficient separation between the axle and the leg of the camera. Perhaps (if thought worthy of being engraved) a little more opening can be made between the two.

The wheels are 16 inches diameter; their tires of quarter-inch round, iron rod; the spokes, for the sake of greater lightness, of tin tubing; and the naves also of tin.

The Triplet Lens.

To the Editor of the Photographic Journal.

Jersey, Dec. 10, 1859.

SIR,—Can you kindly find space in your next Number for a few remarks in reply to a letter in your last, signed "ONE WHO HAS BEEN AN AMATEUR PHOTOGRAPHER FOR THE LAST 15 YEARS"?

I have found when using out-of-door portrait lenses, with a diaphragm between the front and back glasses, that a round spot of stray light produces a round dark spot upon the negative, sometimes *at* the centre, and sometimes *near* the centre of the picture. I enclose you a print exhibiting this defect, and which was taken from a negative purposely under-exposed.

The same thing occurs with the Triplet, and no doubt for the same reason.

The dark spot is smallest and most clearly defined when the smallest stop is used; and it spreads in size as you increase the size of the stop, until with full aperture it produces a general fog upon the picture.

The fault may be remedied to a great extent, if not entirely, by laying an annulus of blackened card against the inner sides of the front and back lenses, and by lining the inside of the tube with black velvet, and using a sky-shade, or hood, in front of the lens.

Until very lately I thought that the above plan was an *effectual* cure, but I am not now *quite* certain of this. There is a possibility that the dark spot in question may be due in some measure to light which first suffers an internal reflexion at the *back* surface of the front lens, and then a second internal reflexion at the *front* surface of the front lens.

I am happy to find that my Panoramic Lens is quite free from this defect.

It is very mortifying, when the optical principles of a lens are correct, to find it unsuited for photographic purposes by the annoying defect in question.

I shall be greatly obliged to any of your readers who will communicate the result of their experience with portrait-lenses used for views, with a small stop between the lenses. I have seen pictures taken in this way without any dark spot; and that seems to indicate that the remedies which I propose are sufficient.

I have for some years felt the great importance of using every precaution, in the construction of the camera and mounting of the lens, for cutting off diffused light; and in my 'Dictionary of Photography' there are several pictures of improved cameras suggested with a view to this object. In various papers in my 'Notes,' and in a paper read before the Birmingham Society last year, I have laid great stress upon the importance of attending to these points; and in first publishing the particulars of the Triplet I stated that much of its value as a photographic lens would depend upon its being properly mounted. If opticians disregard this advice, and mount the Triplet improperly, it is really not my fault if it does not answer.

THOMAS SUTTON.

Archer Fund.

To the Editor of the Photographic Journal.

Braemar, Aberdeenshire,
December 10, 1859.

SIR,—I have read with much pleasure the letters of a "London Photographer" and Mr. T. Ross on the subject of the 'Archer Fund' in the last Number of your popular and useful Journal, and, although not profiting materially from the practice of photography myself, feel called upon, in however slight a degree, to acknowledge my obligation to the late Mr. Scott Archer, which I now beg to do by enclosing herewith a small *annual* subscription of one guinea. I agree with Mr. Ross that the photographic world have unquestionably in this case a moral duty to perform, the which, if it be withheld, will infallibly reflect discredit upon the profession. And it is with professions as with individuals—the performance of a moral duty can never be deferred, much less omitted, without moral injury; while the converse holds equally good, that the performance of every such duty is attended with increased dignity and self-respect, and all their concomitant advantages,—a moral reward, which is always proportioned to the cordiality and promptitude with which the duty is performed.

It cannot be that any one, much less a parent, can day after day practise the Collodion Process without now and then turning a thought to the orphan children of the man to whom, above all others, he is indebted for, as the case may be, either his pleasure or his profit.

A noble example has been set in this instance by Her Majesty the Queen and His Royal Highness the Prince Consort, who, with a readiness which must have given double value

to their generosity, acknowledged most unequivocally their sense of the obligation that was due, not only from photographers and all who benefit either directly or indirectly from photography, but also from the public in general, for whom this beautiful and useful art has presented a new and extended pleasure of the most refined and elevated description.

Sorry should I be, Sir, for the credit of all that is noble in human nature, and most of all in Englishmen, to see either the one or the other indifferent to the claim of these poor children, or that strong claim either niggardly or sluggishly acknowledged. Depend upon it that it would be a reproach that would adhere to them indefinitely.

THOMAS PEARCE.

CONTRIBUTIONS RECEIVED.

	£	s.	d.
Percy Standish, Esq.	2	2	0
Thomas Pearce, Esq.............	1	1	0

The Photographic Process.

To the Editor of the Photographic Journal.

16 College Green, Dublin.

SIR,—I send, for the inspection of yourself and friends, a proof from a photoglyphic plate, untouched, the subject, College Green, Dublin, from what is called an instantaneous photograph, executed by Mr. Fox Talbot's new process.

I have from time to time tried all the processes for the engraving of photographic pictures, including the daguerreotype; and, as a practical engraver and a photographer of upwards of twenty years' practice, I consider the photoglyphic process far superior to all others; in fact, I can produce with it all that can be desired in the representation of animate and inanimate objects, preserving the faintest tracery, the half-tone, and gradations of tints to the deepest shades; and I have in no way to use the graver, except for the margin and name. At an early date I will send you particulars of the plans I adopt, and other specimens for publication and distribution.

I consider that this, the last of the many inventions and improvements of Mr. Fox Talbot, crowns the capital of photography, and hope to see the day when Her Most Gracious Majesty (an amateur engraver and photographer herself) will confer on Mr. Fox Talbot, the father of photography, some distinguished mark of her favour for his invaluable services to this infant art—an art calculated to extend still further the education and comfort of her subjects, and to surround them with whatever is beautiful in science and in the useful and ornamental arts.

FRANCIS S. BEATTY.

*** The print kindly sent by our Correspondent is suspended in the Rooms of the Society for the inspection of the Members.—ED.

New Panoramic and View Lenses.

To the Editor of the Photographic Journal.

Jersey, Nov. 25, 1859.

SIR, — A short time ago you were kind enough to publish a letter from me, announcing the invention of a new panoramic lens for pictures, including an angle of 120°. I am happy to inform you that I have had a lens made on that principle, and that it answers perfectly, and does all that I expected.

Moreover I have lately invented a View-Lens which I have no doubt will prove superior to the Triplet, or, in fact, to any other View-Lens. It is simple in construction, and gives images free from distortion, which include a very wide angle upon a flat plate.

I will shortly send you descriptions of both these instruments; and I shall be glad if, in kindly publishing this letter in your esteemed Journal, you would do me the favour to add that, if any of the leading members of your Society will form a Committee for testing these inventions, I will supply them with the necessary means of doing so.

THOMAS SUTTON.

Photography and Progress. The Past, the Present, and the Future.

[From 'All the Year Round.']

TWENTY years ago, if we wanted our portraits taken, we could only go to the gentleman in Soho or Fitzroy Square, who painted us in oils, with the column, the curtain, or the cut orange on the plate, with an unnatural shirt collar, clothes too new for us, and eyes staring into vacancy. For miniatures, there was the fashionable artist in a shawl dressing-gown and a Turkish cap, who stippled us up in ivory, with pink eyes like a white rabbit or an albino, an elaborate gold chain round our necks, and a highly-finished Buhl inkstand, with a great quill pen to break the dark background on the curiously arabesqued table-cloth. Cheaper performances "in this style" were undertaken by modest practitioners, who dwelt in second floors of the Strand or Oxford-street, and exhibited gold frames full of specimens on the street door; simpering ensigns in scarlet, and languishing ladies with low-necked dresses, evidently copies in water-colours from the Book of Beauty. Photography has swept all

these poor mediocre artists away. Some, the better section, have started up again as first-class photographers, or find employment in colouring to miniature texture the productions of the sun and lens. Others, the mere inferior, take photographs, abominable in quality, for sixpence and a shilling, in vile little slums; Sunday being their great market day: there are legions of people abroad on the Sabbath who have their portraits taken for want of something better to do. Some, the very worst, may have sunk into the touters who stand at the doors in the aforesaid slums, with shilling specimens in their grimy hands, wheedling or bullying the passers-by to come into their masters' murky studios and be libelled on glass. And some, poor wretches, for aught I know, may be picking up sorry crumbs as photographees, sitting as models for the personages in those stereoscopic slides which look so curiously like life, and so hideously unlike it, showing their bleared faces and crinolines and legs, and playing their miserable antics for a penny wage. A most noteworthy feature of the things that have taken possession of London is this stereoscopic mania. It is very good, I think, to look on marvellous transcripts of nature, to peep through two little holes at a scrap of card-board, and say: There are the Grands Mulets, there is the Court of Lions, there is the Alameda of Seville, not to have seen which is not to have seen a wonder. There is Mount Hor, there the Mount of Olives, there the church of the Sepulchre, there the place of Job's tribulation—not as painters and poets have imagined them, but in their actual, terrible reality—barren, sunburnt, arid, desolate. See; that little speck among a thousand heads is Queen Victoria. By her side is Eugénie, in a white bonnet; that little dark streak is the real life-like twist of the moustache of his Imperial Majesty Napoleon III. These are not phantoms; they are real, and the sun cannot lie. It is good, I say, to look into these magic mirrors, and the reflective man may glean many and salutary lessons from them; but how does it stand when we come to photograph humanity tortured into the similitude of an ape, or caricatured into sham angels and sham ghosts? What a cold, pallid glare is thrown by the stereoscope on the deliberate indecencies the knaves have striven to perpetrate! Faugh! take away this miserable wresting of sunbeams; this forcing them to irradiate dust-heaps and sewers.

Not to be denied, however, is this great fact of photography: very potent and various in its usefulness at this time. It has taken giant strides from its little dim cradle, full of misty shadowings of corpse-like colour, and distorted parts, called daguerreotypes. Photography is everywhere now. Our trustiest friends, our most intimate enemies, stare us in the face from collodionized surfaces. Sharp detectives have photographs of criminals of whom they are in search. Foreign police agents speculate upon the expediency of having the portraits of travellers photographed on their passports. People are photographed on their visiting cards, or have tiny albuminized portraits of themselves in the crowns of their hats. There are photographs so minute as to be invisible, save under the microscope. They photograph infants and dead people. I was in Bedlam the other day, and the kind physician showed me an album full of photographs of the mad folks. There was Case XVI., raving in acute mania, hair erect, eyes starting, muscles distorted, mouth convulsed, hands clenched, limbs thrown here and there; and, lo! on the opposite page was Case XVI. again, in a lucid interval, clean shaven, prim, demure, with an irreproachable collar, a white neckcloth, and a faultlessly buttoned coat. Could the old mad doctors ever have dreamed of this, among the phantasma of chains, manacles, gags, whips, and whirligig chairs, among which they kept the stricken people! What sore and terrible an astonishment photography would have been to them in the days when their old caps and three-cornered hats, their powdered wigs, and golden-headed canes were new! This photography seems an obedient slave, and has never claimed any fierce or arrogant mastery. It has never blown any one up, or rent anybody asunder, or maimed anybody; though a skilful photographer tells me that the art may yet exact such penalties for extreme rashness or dense stupidity. The worst harm it has wreaked has been to stain a few manipulators' finger-tips a little. It is not free from vice: witness those semi-ribald stereoscopes; but it abhors the crimes of violence. Of course it is in its infancy. Steam, you know, is in its infancy. So is ballooning. So is cotton-spinning machinery. Crompton's mules and Hargreave's spinning jennies will be preserved as curiosities in museums some day. And we go maundering on about things being in their infancy in this old old world, till our hair falls off and our teeth fall out, and we, too, are in our infancy, and Goody Crossbones comes and tucks us up, and gives us a spoonful of that Daffy's Elixir which lasts us till Trumpet-time.

Gutta-percha is in immense request for walking-sticks and riding-whips, and, ah! it is strange how very soon mankind become habituated to things that can be turned to a wicked and cruel use. Within eighteen months after the introduction of this useful substance

into civilized life, a woman was tried in India for the murder of a child by beating it to death with a gutta-percha whip. *She* had found out the tough, pliant qualities of gutta-percha in a trice—the Jezebel. But it has been turned to nobler purposes, and married to substances as marvellous. See yon dandy who, among the charms at his watch-guard, carries what appears to be a little cylinder of chocolate, with tiny pips or spangles of copper at the summit and base. That is a tiny toy fragment of the Atlantic cable-wire incased and isolated by gutta-percha. Once, twice, the great attempt has failed; but it will be renewed again, and must eventually succeed. The Atlantic cannot suffer the puny British Channel, the Red Sea, and the Mediterranean, to laugh her to scorn. The cable must be laid; and gutta-percha and wire, safely submerged beneath the roaring waves, will tremble at the thoughts of men, and carry from world to world the tidings of the greatest marvel that has been accomplished since the oldest human cap was new.

It would be easy to multiply examples, but who would have the patience to listen to them? Some doctors tell us that we change our corporeality once in every seven years, and that we have not the same bones, muscles, sinews, that we had then. 'Tis as certain that our lives themselves are changed, and in the manner of them different every year, as that the days follow and do not resemble one another. "Where is the life that once I led?" sings madcap Petruchio in the play. Where, indeed, are the lives we have led? We can live them no more; no, not one iota, one moment, one fractional spark of their time again. I set little store by Fashion and its changes, by the sleeves that were long yesterday having given way to the sleeves that were short thirty years ago. Once the "Lancers" as a dance was fashionable, then it sank into desuetude, then it was revived again, and became doubly fashionable. This chopping and changing and wheeling about, and coming back again to the starting-point, is worthy of Fashion: fashion in dress, diet, reading, and the bowing and scraping customs of society. But this paper would have been written in vain had I not endeavoured to maintain that we see, every year and every day, new Things, that are built up on the ruins of the effete and useless past, that suffer opposition for a time, but progress, and wax strong in the land, and ultimately obtain and prevail. Our state is no millennium, Heaven in its justice knows; but every year sees a bad old Thing disappear, and something new and smiling in its place. Not that the new things are perfect. Damp and unseasoned as in their youth they must be, the weeds and fungus and mildew will cover them with lightning rapidity if the greatest vigilance be not displayed. Witness railways, photography, gutta-percha, all attacked by foul parasitical plants almost so soon as they were known. But it is the greatest argument against Finality that few things stand so much in need of Reforming as Reform itself. When there is nothing left to Reform and we have Perfection, not in sentimental theory, but in truthful practice, Conservatives and Radicals may shake hands, for the Millennium will have arrived, and the caps that were old shall be made new again.

Cleansing the Hands.

To the Editor of the Photographic Journal.

December 5th, 1859.

SIR,—In your last Number, a correspondent, "J. M. S. B.," suggests a method for removing the stains of nitrate of silver from the hands. I think I can inform him of a better. I always keep ready a small vial containing a very strong solution of *iodide* of potash (I also abominate the cyanide as much as he does); with this solution I moisten the spot, and while it is still wet I apply a drop or two of glacial acetic acid, which I rub in with one finger. The stain soon disappears. He will find this a far pleasanter operation than pumicing his flesh.

C. P.

The Future Science of Photography.

[From the American Journal of Photography.]

WE constantly progress in our knowledge of photography; we revise our experience and add new facts. Novelties turn up fast enough to keep alive our daily interest, and maintain our resolution for research more profound tomorrow. For the future we see territory unexplored, and inviting adventurers to embark: a hundred paths are before us; success is sure to crown the work of courage and skill. Does an ambitious novice ask for a hint? The exact and complete chemistry of gun-cotton is to be found out. What is the matter which precipitates on exposing an old bath to the light? What is the brown matter which appears on sensitized paper kept in the dark? What are the exact chemical changes of the toning bath —of the fading photograph?

Photography is progressing, and the mass of facts seems bewildering, till we sort them out, and enclose them in the proper bonds of scientific generalization. Then the individual fact seems lost, with all the labour it cost, and all the fame its discoverer anticipated. It is the first step which costs, in science as in trade or

love; crowds of earnest and thoughtful men in many generations grope about in the obscurity, gathering knowledge piece by piece, till at last some cunning architect, out of the confusion of what appeared to some eyes only rubbish, constructs a new science, which we may explain to our children at school. Can any one doubt that we are collecting the materials of a great science? In a hundred years there will be children who may learn in a day what we comprehend but poorly in a lifetime of study.

REVIEW.

Italian Peasants. A "Festa" Day. Photographed from Life at Rome. By LAKE PRICE. London: Fores & Co., Piccadilly.

THIS may be called one of the photographs of the season, on account of its superior execution and great truthfulness. It relates, moreover, to a subject now so much engaging public attention—Italy, unfortunate Italy. The scene is laid in one of the outhouses of an Italian homestead in the Campagna di Roma, or the outskirts of the city, and represents a family or neighbourly meeting on an Italian holiday. The whole group consists of ten persons, each characteristic in its way. To the right lies the main point of interest—two men sitting at a table and playing at cards. The man seen in front is the very type of modern Italian intelligence, we may almost say *cleverness*. His piercing look indicates the wish of guessing the nature of the cards which his antagonist—an old, rather quiet-looking man—has in his hands. A third, equally senile person, standing a little aside, *reviews*, as it were, the progress of the game. A bottle of wine, of the usual Italian shape, indicates the good humour of those present, and the festival occasion of the meeting. As photography is the most [only?] truthful of depictors, this plate may be taken as an epitome of the present state of the Ausonian Peninsula. The faces of all the adults present, except the children (of whom we shall speak by and by), exhibit what Göthe calls "out-worked" (*ausgearbeitete*) physiognomies. Besides, the dress of the men is so very characteristic: "*omnia secum portans*"—the sheepskin *paletot*, in what seems to be summer; and a mantle still adding to the burthen of the attire. And then, mark, the modern Italian peasant has not yet got into the wearing of either boots or shoes—raw skin sandals, tied with leather straps, encompass his feet, as they did those of the Roman rustic 1800 years ago.

The "Hand of Cards" is obviously the *factotum* of a Roman holiday, as, besides the three persons named, another old man sitting on the brim of an antique fountain, and a woman with a pitcher of water on her head, direct their eyes to that performance. To the left of the plate, a rather stout female, dressed in the characteristic Roman costume, has just filled her pitcher, and is about, it seems, to go away. The juvenile portion represented in this "Festa di Roma" consists of three individuals. There is a boy sitting on the grass at the foot of the antique fountain—the very image of an Italian boy, as we are used to see them even here. He is a rather handsome lad, cunningly smiling, which bares a set of feline-shaped teeth. His rather contemptuous smile is intended for another boy, who sits, sulkily, on the other side of the scene, obviously disappointed at something. A nice little girl, to whom this Festa seems not very amusing, sleeps leaning on her mother sitting close to the card-players.

There is a certain taciturn, melancholy cast extending over this characteristic plate; it appears as if no smile, no hearty laugh, not even a thought (!) could ever issue from the number of people here congregated. It will be characteristic for the English beholder to observe, that not a trace of a book or newspaper is introduced here; it must be altogether a *triste*, monotonous, silent life, different from that time when, as Byron says, "Venice was the masque of Italy."

It is needless to say that a plate thus thought and conceived is perfect in respect of its execution; it bears the strictest examination, and improves the more it is looked at.

Germany.—The King of Bavaria has granted the African traveller Dr. Roscher, from his privy purse, the means to make researches in the interior of that part of the world.—The Catalogue of the Library of Frederic Schiller, written in his own hand, and comprising chiefly memoirs, will be printed, as a memento of the centenary of his birth.

Paris. Shelter for Promenaders.—Among the numerous major and minor improvements now carried on in the French capital are the "Nouveaux Abris au Bois de Boulogne." They are in the form of Turkish kiosks—a pyramidal roof supported by wooden pillars, to protect persons frequenting public gardens from a sudden gush of rain.

We have received two communications from Mr. C. J. Burnett, which are in type, and shall appear in our next.

We must defer several replies to our Correspondents until the next Number.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 93. JANUARY 16, 1860.

THE Seventh Annual Exhibition of the Photographic Society was opened, by the inspection of our august Patron the Prince Consort, on Tuesday. On Thursday a select portion of literary and fashionable London was received at a private view. On Friday the public entered. The apartments were crowded with company, and the walls of this finest old photographic haunt were covered with numerous and excellent specimens of the art. The room being somewhat smaller than usual, the Council have this year exercised a severe revision of the work sent in. The consequence is visible in the absence of crude and unfinished productions. A certain test of attainment is a demand which can now be fairly made on the professional or non-professional artist. Many inferior specimens have been rejected; and therefore, even if it be true, as has been said, that our Exhibition presents no startling features—no one curious or amazing work—we are not aware that this is a thing to be deplored by the genuine photographer, carrying away general observation from the merits of careful but not obtrusive pictures. We think the common impression of able judges is, that this is a good and successful Exhibition.

In past years it has been customary for the Members and the friends of the Photographic Society to meet at a Soirée those forming the Councils of the different Scientific and Literary Societies of the metropolis. The experience afforded by the private view of Thursday last, when nearly 500 persons were admitted in the present Exhibition Room, shows that it must be impossible to assemble together as many as it has hitherto been customary to do; it is therefore proposed that two Soirées should take place, one during the present month, and a second in the month of February; and, in order that fairness and impartiality may be exercised, half of the Members whose names come into each letter of the alphabet will receive a card of admission for themselves and lady or gentleman to accompany them on each occasion. The Secretary will also be pleased to furnish, in any special case, an extra card of admission.

The print which was promised to accompany the present Number being the kind gift of Mr. Joubert, it is thought desirable to delay the issue of it until the following number of the Journal. Mr. Joubert's process, which he names "Phototype," is truly what it professes to be. It appears that a certain amount of light is absolutely necessary to produce good impressions; and when the large number required (viz. 3000 impressions) is considered, those who are practisers of the photographic art will appreciate the difficulty of its accomplishment at this period of the year, when, with the ordinary silver processes, it has been found very troublesome to obtain a few impressions per diem.

The Annual Meeting of the Society for election of Officers, &c. will take place on Tuesday February 7th; and after the Report of the Council is read, it is hoped that the Committee on Collodion will be able to give their first Report.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

PHOTOGRAPHIC SOCIETY.

ORDINARY GENERAL MEETING.

TUESDAY, JANUARY 3, 1860.

ROGER FENTON, Esq., Vice-President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The Rt. Hon. the Earl of Caithness, J. W. Robinson, Esq., and T. Carrick, Esq., were duly elected Members of the Society.

Mr. Collie exhibited a series of portraits taken many years since by the Calotype process, and which are referred to in his account in the present Number of the Journal.

The Chairman reminded the Members that this was the night for the nomination and election of Auditors, and to nominate for the Council in lieu of any of those names recommended by the present Council.

Mr. Bedford seconded the Motion, which was duly put and carried.

Vernon Heath, Esq., and the Rev. John Mayo were unanimously elected Auditors.

The Secretary read a letter from Mr. Joubert stating his inability to attend the Meeting, and his pleasure in sending a few impressions of the intended print for this Journal, and stating also that the light lately has prevented his proceeding so fast as he had expected.

The Chairman called attention to one of the specimens.

A Member asked what was the nature of the process, and what it was called?

The Secretary stated that it was from an untouched photographic negative, that it was in printers' ink, and was indestructible. Mr. Joubert had called it the Phototype; he did not intend to patent it, but he proposed to establish a printing-office, and afterwards to give the process to the public.

The Chairman announced that after the conclusion of the annual business at the next meeting, if there shall be time, the Collodion Committee intend to bring forward their Report upon the wet and dry processes.

Mr. Crace thought the Council wished to obtain the names of those gentlemen who have practised the different processes of wet and dry collodion, so that when the matter comes to be discussed they may be prepared.

The Chairman stated that he expected to have a very interesting discussion on the dry process at this meeting, and called upon Mr. Heath to explain the features of improvement of a tent he exhibited in the room.

Messrs. Murray and Heath exhibited a "Smartt's Photographic Tent," for the purpose of explaining the improvements that have been made in it.

Mr. Heath said,—This tent is now so well known and so extensively used that it is not necessary that I should occupy the time of the Meeting by explaining the principle of its construction.

My object is this:—The experience that has been gained by the manufacture of a large number of these tents has originated several minor improvements, alterations, and additions. These, with your permission, I will now explain:—

1st. As to the table (for the framework of the tent remains much as at first designed), originally two grooved pieces were used, which being fitted on to the ends of the table, rendered it rigid; the operation of doing this was, however, found to be rather troublesome, especially if the table had been packed up when wet by use. The two pieces I hold in my hand were substituted for the grooved end-pieces, and by this change the table is not merely increased in strength, but is much more quickly and easily put up.

Further, in the old form of table, a hole was cut of sufficient size for the insertion of an india-rubber-cloth sink; this, while it weakened the table, made it difficult to use a developing stand. This leads me to the second point, viz. the new developing tray, an arrangement which I venture to say is worthy the attention and examination of photographers on account of its efficiency and portability. It will be observed that it is made of india-rubber cloth, has two of its sides fixed and rigid, and its two ends moveable; thus it folds up into a space but little larger than one of its sides.

I will now fix the table in its place on the frame of the tent, and will merely remark that nothing can be desired firmer and more rigid than the whole arrangement has now become.

My third point is the economy of the working space of the table. A portion of it is, of course, occupied by the tray I have just described. The nitrate bath—which is one of our new glass baths with glass air-tight top—is suspended from the front of the table, and rests upon a portion of the framework of the tent: by this means the space it would occupy if placed on the table is reserved.

A contrivance was then devised for disposing of the plate-slide of the camera, in order to gain the space it required if placed on the table. This contrivance is simple and effective, and can be used for various sizes, for which it provides a safe and convenient place, both before and after the exposure in the camera.

The disposal, as thus explained, of the bath and plate-holder leaves ample space on the

table for manipulating the largest-sized plates. The collodion-pourer, the developing plate-holder, the developing cups, and the water-bottle (the latter is suspended over the tray, as now placed), have all special points in construction; these I will not take up your time by explaining, as they will be best understood by examination.

Nor need I describe the cover of the tent, as it will easily be imagined how this is put over the framework, and how the operator can close himself within it. I may, however, say that it is provided with a ventilator, yellow window, pockets for cloths, and an entrance formed for the purpose of being light-tight, like a double curtain.

This, then, is Smartt's Tent in its present state; and I may remark that, having had considerable experience in its use, I consider it very successful; indeed I believe it merely just to say that Mr. Smartt has the honour of having designed the most useful and effective tent yet made. This is so constantly confirmed by the letters of those who have them in use, that I do not hesitate to speak of its merits in the terms I have.

I will ask, in conclusion, permission to mention a circumstance which, on the one hand, is confirmatory of the merits of the tent, and, on the other, is personally very gratifying to myself:—Messrs. Negretti and Zambra some months ago sent out, with their photographer, one of these tents to China and Japan; and only last night (this gentleman desiring to extend his operations) they sent off a second one. Now I argue that this, coming as it does from a house manufacturing so extensively their own apparatus and contrivances, is as high testimony in its favour as can be desired.

The Chairman thanked Mr. Heath for his kind explanation, and called upon Mr. Hardwich to read a paper.

Mr. Hardwich then read the following:

On Collodion for the Dry Processes.

In the first attempts to prepare a collodion suitable for dry processes, it was found that there were advantages in making use of materials like rotten cambric, shreds of filtering paper, old lint, and other like substances in which the cellulose has undergone partial disintegration by the action of chlorine, caustic alkalies, &c.; a pappy and broken-up structure of collodion being more easily obtainable in that way than by working with the fine cotton wool as it exists in the raw material. Nothing, however, will be said in the present paper on the use of these bodies, since it is now well established that both uniformity of product and stability of collodion are, to a great extent, sacrificed by their employment; and further, that the fibre of linen, being chemically different from that of cotton, does not yield a similar quality of collodion. All must be done, therefore, with the best cotton wool, and we must look to the nitro-sulphuric acid for bringing about the physical and chemical modifications which are required.

The first experiment which gave me a clear idea of the rationale of producing collodion suitable for dry processes was made at the time when so much was said of Gaine's process for making vegetable parchment. It occurred to me to try how this modified cellulose would succeed in the preparation of pyroxyline, and I therefore cut a piece of paper into several slips, and floated them upon the diluted oil of vitriol for varying periods of time—five, ten, fifteen, twenty, forty seconds, and so forth, afterwards washing with water, and drying each piece perfectly. The shrinking and toughness of the paper appeared to increase with the time on the acid, and, in the case of the pieces last removed, there was a peculiar jelly-like feeling whilst they remained in the washing-water, as if a chemical change had commenced. Now these pieces of parchmentized paper, on being subsequently dipped in nitro-sulphuric acid at 130°, all yielded pyroxyline soluble in ether and alcohol: but there was a marked difference in the quality of the collodions so made; for whilst the earlier samples gave a fine and tough film, the later ones—those left longest on the sulphuric acid—produced a collodion which is known as *powdery*, rubbing up under the finger like soft soap, and adhering very tenaciously to the glass. The inference was, that the parchment collodion resulted from the first or action proper of the sulphuric acid, and that the powdery pyroxyline was due to a subsequent or disintegrating effect of the same acid, which perhaps might be a partial change into dextrine. At the time, it seemed to me logical to draw the above conclusion, but facts have since come to light which show that it is not entirely correct.

When it became evident that the sulphuric acid exerted a modifying action in the manufacture of pyroxyline, the next question was, whether a mixture of oil of vitriol and nitric acid could be made in such proportions as to produce at once the full effect, and so to yield a product corresponding to that which is obtained when the fibre is first parchmentized and afterwards made into a substitution-compound by nitric acid. If this were possible, the action of the sulphuric acid must precede that of the nitric acid, because, although it is easy to make the vegetable parchment into pyroxyline, yet pyr-

oxyline, once formed, cannot afterwards be changed in properties by immersion in diluted oil of vitriol, but is protected and remains in the acid without shrinking. Therefore, in order to give the preponderance to the sulphuric acid, we make the bulk of that acid relatively greater, and in this way the parchment quality of collodion may be obtained.

If, however, the theory above propounded were correct, that the action of the oil of vitriol has two stages, a condensing and a disintegrating stage, it ought to be quite possible to prepare the porous or soapy pyroxyline in the same acid mixture which is found to answer for the parchment pyroxyline, and especially since we have it in our power to increase the action of the acids *by raising the temperature*. Experiments, however, afterwards proved that this mixture of three measures of oil of vitriol to one of nitric acid was not the best for preparing the most powdery kind of film, and that no increase in temperature or alteration in the proportion of water sufficed to give the desired result. Nothing remained therefore but to consider the theory afresh, and on doing so the weak point soon came to light, viz. that I had overlooked an effect of the *nitric acid*, not hitherto described, and that, to produce the pulverulent state of film in perfection *in one mixture*, the nitric acid ought to be in excess over the sulphuric. It appeared, however, that the most complete disintegration resulted when the nitric acid was brought to bear upon a material which had previously been acted on to the full extent by oil of vitriol; and this explains why, in the experiments with the strips of parchment paper, the latter samples of collodion were so entirely porous, viz. those produced from the material which was at the verge of transition into dextrine before it entered the nitric acid.

Having perfected the theory, it now corresponds with the experimental results, and either quality of collodion becomes obtainable at will; for if in a mixture of three measures of oil of vitriol, one of pure nitric acid of 1·45, and rather more than three-quarters of a part of water, there be immersed cotton, at 150° F., the fine transparent, tough material containing a minimum quantity of the peroxide of nitrogen is prepared; to convert which into the powdery pyroxyline we have only to dry it, and dip it for an instant in a mixture of the same acids, and at 150°, but with the proportions reversed, viz. three measures of nitric acid to one of sulphuric, in place of three of sulphuric to one of nitric, the water in the formula being omitted.

In this process, a very short immersion of a few seconds suffices, and there is not much loss from solution; the pyroxyline does not gelatinise in the hot nitric acid, and can afterwards be easily washed in water, but it loses nearly all its tenacity, and flies about in dust when it is dried and rubbed by the finger. Its properties undergo an important change as regards the action of solvents, for, whereas it was before unacted upon by absolute alcohol in the cold, it now liquefies into a gummy mass on treatment with this liquid. In collodion the properties differ widely from those of the parchment pyroxyline, the latter setting firmly and quickly upon the glass, but the former being nearly deficient in power of setting; so that, if the proportions of the ether and alcohol remain the same, when you allow five seconds in the one case before dipping the coated plate in the bath, sixty seconds would be required in the other. The parchment pyroxyline forms a somewhat opalescent film on dipping in the bath if the collodion be only moderately iodized, but the powdery pyroxyline produces a dense and creamy film under the same circumstances. If these films be washed with water and dried, the former has a varnished appearance and may be rubbed with the finger without injury, but the latter is lustreless, and seems to exhibit the iodide upon the surface rather than in the substance of the film. When the sensitive plates are washed with water, and reared up on blotting-paper to drain, the parchment collodion soon assumes a condition in which it is not easily wetted, but the pulverulent film remains without much change, and a solution of albumen or a developing fluid flows quite up to the edge, without receiving any check.

Although the effect produced upon the pyroxyline by the second treatment with hot nitric acid is so remarkable, we cannot suppose that any fresh peroxide of nitrogen is imparted to the fibre; three measures of nitric acid of 1·45, when mixed with one measure of oil of vitriol, produce a weaker nitro-sulphuric acid than is usually employed in the manufacture of pyroxyline, as may be proved by the immersion of cotton wool. The wool is rendered soluble at a temperature of 150°, but the film becomes cloudy on drying, and the pyroxyline itself burns in the manner of the compound made in weak acids. It dissolves also in hot glacial acetic acid, a property which Mr. Hadow mentions as peculiar to the weakest of the two substitution-compounds available for photography. This pyroxyline, which is made in one acid only, does not, however, correspond exactly to the other, prepared, as before said, in two different mixtures, although the state of dilution of the nitric acid in the two mixtures is nearly the same; for not only is that which has been acted upon by the oil of vitriol in

addition to the nitric acid more broken up, but it yields a very limpid, structureless collodion, which adheres firmly to the glass.

We now pass on to examine the action of these collodions in the dry processes, taking in preference those of Taupenot and Fothergill; and I may mention that the majority of my experiments have been made with the Fothergill process, inasmuch as the plates are readily prepared, and show very characteristic differences in development. It was stated by Dr. Norris, in his early papers on the dry process, that a powdery structure of collodion allowed a ready penetration by liquids, and so favoured quick development. This may be true to a certain extent; but, in my own experience, I have found that energy of development depends much upon other causes independent of physical structure. On comparing the horny parchment collodion with that in which the film is made porous in the mode previously described, it is evident that both yield feeble images when newly iodized, but that the powdery collodion does so especially: not that this image developes more slowly than the other—on the contrary, it comes out rather rapidly—but it has a peculiar *grey tone*, such as would be produced by nitric acid in the bath. This metallic aspect of the image depends upon the pyroxyline, and has nothing to do with imperfect washing or impurities in any form, which should be carefully guarded against in an investigation like the present. The weaker the acid, and the more powdery the film in consequence, the worse the defect; and, in reflecting on the cause, I was led at length to attribute it in part to the peculiar manner in which the iodide is precipitated in a film of this structure, for on one occasion the whole picture dissolved off into the fixing bath, leaving the collodion intact upon the glass, thus rendering it evident that the iodide of silver was not imprisoned by the pyroxyline in the usual manner, but simply rested upon its surface. To overcome this, the same pyroxyline was dissolved in a mixture consisting principally of ether, with only a small quantity of alcohol in the absolute state, and iodized with the cadmium compounds in preference to those of the alkalies. By this proceeding a more contractile film was obtained, which bore rubbing without losing its iodide, and on trial it was found that the intensity of the image was decidedly increased, a brown tone having taken the place of the grey.

As the question of colour and intensity of image is of importance, I shall not leave it without making a few more remarks. Why would the fact of the iodide of silver resting merely upon the surface of the film in the case of the powdery collodion be calculated to lessen the density? Probably because the pyroxyline made in the way which I recommend is not altogether inert to the salts of silver, but has somewhat of that action which we find possessed by albumen and many other organic bodies, of increasing the intensity of the developed image. This position I am quite able to maintain; and if we allow it to be true, it suggests the importance of having the iodide *in* the film as well as upon the surface.

We now pass on to consider the effect of keeping the collodion for a time in the iodized state before using it; and I may mention, that in the experiments a portion of *bromide* was associated with the iodide, not only because it has a more decided action in carrying down organic matter and fixing it upon the film, but also because the use of bromide in the dry processes does not retard the development or make the image metallic, as it does in the wet. The bromide and iodide of ammonium and cadmium in the proportions used for positive collodion form a mixture very proper for the purpose.

The horny collodion newly iodized is extremely sensitive in Fothergill's process, but the image developes somewhat feebly, and with a long-focus lens in a subdued light there would be a want of contrast. This condition of collodion does not allow of too much washing before the albumen is laid on; otherwise the above-mentioned defects increase and the development becomes difficult to manage. Old iodized collodion differs in this respect from new: there is more decision and contrast in the picture; and, supposing the preparation to be in a certain state, the plate may be washed rather freely with water previous to the application of the albumen, without interfering much with the intensity. This, therefore, is the point to which my attention was directed.

Whatever be the exact nature of the change which takes place in collodion after iodizing with the alkaline iodides, we cannot doubt that in its essential features it consists in the pyroxyline displacing a portion of the base, and in some manner neutralizing it. We therefore strive to imitate this change by adding a portion of free alkali to the collodion; and, as far as my own observations extend, the effect of all the alkalies and alkaline carbonates is nearly the same, photographically speaking. If there be a difference, it is rather in point of time and in rapidity of action than in any more essential particular.

Taking a sample of the horny collodion made as before described, I add to each six drachms two drachms of absolute alcohol in which has been dissolved a quarter of a grain of pure

potash free from carbonate. The liquid immediately becomes ropy, and, with a less proportion of alcohol, semi-gelatinous. In a very short time, however, the ropiness goes off, and the collodion is then rather more limpid than previously to the use of the potash. At this stage, a few drops of an alcoholic solution of nitrate of silver, added to a small portion of the collodion in a test-tube, produce a *white* turbidity. If the cloudiness should be white at first but afterwards assume an olive-brown tint, a portion of the potash still remains in the collodion in a free state. Perhaps the safer plan will be to allow the action to continue for twenty-four hours, after which the precipitate produced with nitrate of silver will be quite white, and it then remains only to dissolve in each ounce five grains of iodide of cadmium and one grain of bromide of ammonium. If these proportions should produce *a blue film*, to which there is always a tendency in collodion having undergone decomposition, they may be increased.

The photographic properties of collodion modified in this way are very remarkable, and, on making trial of it in the dry processes, we see at once that an important change has been produced. The tendency to active development is so strong in Fothergill's process, that it matters very little in this respect how far the washing is carried before putting on the albumen; for, even if the free nitrate of silver be fully removed by copious treatment with distilled water, there is no difficulty in obtaining a dense picture. In the oxymel process, the plates develope with a bloom and ruby-red colour like wet collodion, and are in danger of running into red solarization. I notice also a clearness and brilliancy in the image, such as usually accompanies a state of film giving intense development; the action of the reducing agent seems so strongly determined towards those parts of the film which have been touched by light that it expends itself, and hence the shadows are preserved in a state of transparency.

There is one objection to the use of alkali in the manner now advised, viz. that the collodion is rendered very tender. The state produced cannot properly be called *powdery*; a more correct term would be *rotten*. If ammonium compounds are afterwards used in iodizing, the film, already weakened as far as it will bear, sometimes gives way, whilst, if cadmium salts are substituted, the adhesion to the glass is lessened and the collodion wrinkles during development. This tendency may be overcome by applying a preliminary coating to the glass, after which the working of the collodion is everything that could be desired. Those who are conversant with the peculiarities of the different kinds of collodion employed in the wet process will readily understand that the state of film now under discussion sometimes fails in rendering the half-tones, and that a hard quality of picture may be produced, unless the proper conditions are understood.

Before passing on to consider further the chemical nature of the changes which take place by the action of alkalies on collodion, it may be well to observe how cautious we should be in recommending any new step in photography without stating all the conditions. The addition of potash, for instance, is a most hazardous proceeding, and one which may bring disappointment. The mode of preparing the pyroxyline must be taken into account, since some kinds are much tougher than others, and will resist a larger quantity of alkali without becoming limpid. This I show by taking three kinds of collodion—*a*, from parchment pyroxyline; *b*, from cotton wool immersed in hot and weak nitric acid, with minimum of sulphuric acid; *c*, from pyroxyline made out of calico. On adding a similar quantity of alcoholic solution of potash to each, the first becomes glairy and subsequently liquefies to the proper consistence, turning at the same time slightly yellow. The second remains colourless, and precipitates a thick white substance, above which floats a limpid liquid almost free from dissolved pyroxyline. The third behaves differently from either, being liquid from the first, and not passing through the ropy stage.

The action of potash upon pyroxyline is decidedly complex, and, although Mr. Hadow has interpreted it under certain conditions, it does not appear to me that the reactions are the same when the alkali is employed in a minute quantity and at a low temperature, as I advise. One thing, however, is clear, that, under all circumstances, *nitrite* of the base is formed: and indeed I have seen definite crystals of nitrite of potash in residues of iodized collodion after fourteen months' keeping.

An alkaline nitrite, such as that of potash or soda, precipitates a white compound with nitrate of silver; and this substance is only sparingly soluble in water. Therefore, if we suppose a collodion to contain nitrite in addition to iodide, the film, after removal from the bath, may be expected to bear a very large amount of washing without entirely losing its soluble silver salt. The effect of nitrite in the *wet* process is to accelerate development, and to increase the contrast between the extreme tints. I find that it acts in the same manner in the dry process; and hence it may prove of service in some cases.

Collodion containing nitrite even to satura-

tion does not produce the same decision of image as that to which potash has been added. This I attribute in part to the fact of *organic decomposition* of the pyroxyline being produced by the potash, which renders it more difficult to wash out all the soluble silver salt. The subject is a difficult one, and needs more investigation, but I will mention a few facts which bear upon it. There are organic substances which produce no precipitate in solution of nitrate of silver, and yet can be shown to combine with it in a loose and ill-defined way. One of these bodies is *gelatine*, as the Committee who reported on the subject at the late meeting of the British Association have shown. If a sheet of gelatine be dipped in a nitrate bath, no subsequent washing will altogether cleanse it from the nitrate of silver; on the other hand, gelatine will withdraw nitrate of silver from its aqueous solution and appropriate it to itself. The substance produced may be termed "gelatino-nitrate of silver," and one of its properties is, that it has the characteristic bitter metallic taste, but gives no precipitate with a minute quantity of chloride of sodium. I find also that *powdered gum arabic*, on being digested in alcoholic solution of nitrate of silver, retains some of the nitrate most obstinately; for if the gum be dissolved in water (after repeated boiling with fresh portions of spirit until nothing more can be extracted), the solution has a strong bitter taste, and remains clear for a time on the addition of chloride of sodium. A third experiment was conducted as follows:—Pyroxyline of that kind which has been fully acted on by the sulphuric acid in the process of manufacture, and which the experience of photographers shows to give an unusually intense image in the negative, was soaked for one hour in an alcoholic solution of nitrate of silver, in the dark; it was then washed very carefully in about twenty changes of distilled water, the washing being continued long after all traces of free nitrate of silver had disappeared; nevertheless, this pyroxyline, on being dissolved in ether and alcohol, gave a brown turbidity with hydrosulphate of ammonia, and on being treated with salt remained nearly clear at first, but afterwards became slowly opalescent*. It must be confessed that the above experiments are, with the exception of that in which gelatine is used, of an extremely delicate nature, and could not safely be depended upon if taken alone; viewed, however, as corroborative of other undoubted facts, they are interesting: and since the photographic and the chemical results tally so exactly with each other, we may safely affirm that, although pyroxyline is usually viewed as indifferent to salts of silver, yet that there are some varieties of that substance which are more or less organic in their reactions; and, further, that any sample of pyroxyline, after undergoing partial decomposition by action of alkalies, will abstract a portion of nitrate of silver from the bath, independent of the presence of nitrite, chloride, or iodide. Pyroxyline, in this state, takes its place as the lowest member of that class of photographic substances containing albumen, &c., all of which are useful in processes where the plate is washed with water previous to its exposure in the camera.

* A pure solution of nitrate of silver throws down a precipitate immediately with chloride of sodium; but when these organic substances are present, either no precipitation whatever occurs, or the liquid remains clear for a time and afterwards becomes gradually opalescent. In the same manner, collodion prepared from that kind of pyroxyline of which we have been speaking may contain a weighable quantity of chloride of cadmium, and yet on dipping in the bath no precipitate may be produced, the film remaining clear and transparent.

At the outset of this investigation I had hoped to perfect a method of purely dry collodion without any preservative substance applied to the surface of the film, but at present I am not so sanguine of being able to do so. The principal defect of Fothergill's process is the slowness of development, which appears to be due in part to the film drying up, and not recovering its porous condition on being wetted. Gum or gelatine prevents this; for although the film shrinks, as before, on drying, yet, when water is applied, it returns to the spongy or villous state which it had on first leaving the bath, and the development is accelerated. The experiments which I have made confirm all that Dr. Norris has advanced, but they lead us a step further; for it is now impossible to deny that these preservative substances have a chemical as well as a mechanical action, and that the colour and general aspect of the image will vary with the particular organic substance which is selected.

Mr. Hardwich observed, at the conclusion of his paper, that it had often struck him as a curious circumstance that solutions of *gelatine* gave no precipitate with nitrate of silver, because gelatine, being prepared by boiling down bones, hoofs, and suchlike animal substances, must necessarily contain chlorides. Upon the addition of nitrate of silver the liquid remained nearly clear; but when nitric acid was added and heat applied, a white precipitate was produced, which was at first taken for coagulated albumen, but proved, on examination, to be chloride of silver. The explanation was, as he believed, that gelatine produced a compound with nitrate of silver, which he would call gelatino-nitrate of silver, and that chloride of silver formed a double compound with this substance. Potash, added to a solution of gelatine and nitrate of silver, did not throw down oxide of silver, but a tenacious extensile substance like india-rubber.

[Mr. Hardwich then performed the experiment in presence of the meeting, and demonstrated the existence of chloride in commercial gelatine.]

The CHAIRMAN invited discussion upon the paper. Nobody rising, he then drew attention to about twenty large and beautiful negatives, some by the dry process, and some upon substances superposed, or laid upon the dry collodion. Unfortunately Mr. Barnes was not at the meeting; but that gentleman had attached to each negative a written description of the different media employed.

Mr. T. SEBASTIAN DAVIS was sure the Meeting was indebted to Mr. Hardwich for the not merely interesting, but also the rational and scientific manner in which he had brought forward the subject of the dry process. He (Mr. D.), in the course of some experiments in connexion with the subject, had immersed thin Swedish blotting-paper in nitric acid of sp. gr. 1·42, and found the paper modified in its texture by the treatment; he then made it into pyroxyline and dissolved it in one measure of alcohol to two measures of ether. He found that it dissolved well, and produced a film of a decided skin-like character, the very opposite of that which Mr. Hardwich had obtained of the powdery kind. He thought Mr. Hardwich had not clearly proved, by his experiments of parchmentizing paper before making it into pyroxyline in the mixed acids, that the same or an analogous effect is brought about upon cotton-wool by using an excess of sulphuric acid in one mixture. There was a difference in the physical condition of the cellulose in the paper and the cotton-wool. If the action of the sulphuric acid and water be continued upon cellulose at a certain temperature, it converted cellulose into dextrine; if carried further, it would be changed into grape-sugar.

He thought it was questionable whether collodion of a porous character was by any means so sensitive for dry processes as collodion of a tougher texture. The principle of preparing a dry plate for taking a picture makes it necessary that the developing fluid should penetrate or enter into that film. Under ordinary circumstances, if we take a plate with a film upon it, allow it to dry, and then dip it into water, we find it so hardened that a developing fluid could not penetrate into its pores; this constitutes the difficulty in using collodion only in the dry condition.

Photography requires a substance soluble in water to fill the pores of a moist collodion film, so that when the developer passes over the plate it shall enter the body and substance of the film, and so produce the desired effect. In Fothergill's, he (Mr. D.) did not think that there was the difficulty or slowness in obtaining the requisite density that had been alleged; and Mr. Hardwich did not state whether he reckoned the time by a comparison with dry plates prepared by other processes, or with plates that are wet. If Mr. Hardwich compared it with the wet plate, undoubtedly it was slow; but he (Mr. D.) thought it as quick as any other dry process with which he was acquainted. He considered there was no difficulty in getting the requisite intensity, but rather that it had an advantage; for if one developed in an artificial light without experience, over-development would generally result; and, taking these facts into consideration, he (Mr. D.) believed we have a truly rational principle in the Fothergill process.

He alluded to the principle as consisting in washing the free nitrate of silver from the surface of the film, then pouring thereupon some substance which will enter the pores of the plate and be soluble, or at least capable of being moistened by water, and finally washing off all the superficial superfluity thereof. He must confess that he had met with a difficulty in the Fothergill process which he had not been able satisfactorily to surmount, and which he would have had great hesitation in connecting with it, but that others had met with the same: the difficulty consisted in the marked appearance of the skies and high lights. He had made modifications of the preparations, but had invariably found that if he used a developing stand, and merely kept the fluid in motion by raising or depressing the same, those marks appeared: if, on the other hand, he poured the developer on and off the plate during the whole period of development, the marks were avoided, but at the sacrifice of a portion of the beauty of definition.

Mr. ELIOT then said,—Although I have not had much experience in the various dry processes, having only tried them partly during one season—when I found (from the uncertainty) working in the dark, and consequent loss of time, was more expensive than the hire of a boy to carry the few extra things required for the wet process,—yet, having given my attention for some time to the make of collodion, I may be allowed to say a few words on the chemistry of this most useful article. Collodion, then, although it is susceptible of an infinite number of modifications from variations in the acids, their temperature, proportions of the solvents, and the iodides employed, yet appears to me to exist only in three distinct forms:—

First, the hard horny film, with a glazed surface, in which the iodide of silver is imprisoned, so that neither the light nor the developer can penetrate, giving when freshly iodized a weak picture all over, and after it has been kept some time intense high lights and weak middle tints, with almost any length of exposure. This sort is totally unfit for any description of photography.

Second, the extremely porous film which Mr. Hardwich has modified this evening, from the ordinary method of old rags, paper, &c. exposed to acids at a high temperature, to a more certain and uniform process. In this film the atoms of iodide are in close contact and adhere together, something similar to the precipitation of the iodide in a measure-glass (or, better still, the chloride), which when allowed to settle down in the dark and then exposed to the light, little more than the surface is acted on, consequently there will only be a weak picture. I shall return to this variety again presently when I have finished with the next and last.

Third, the extremely gelatinous and slightly porous film. This is best made by the first process of Mr. Hardwich, namely, exposing the best cotton wool at a moderate temperature to the mixed acids, with excess of diluted sulphuric; then dissolving with as large an excess of the strongest alcohol as possible, and iodizing with mixed iodides of cadmium and potassium. It is a singular fact, which has before been noticed, that the iodide of potassium, which is sparingly soluble in strong alcohol, readily dissolves when the two salts are triturated together before being put into the spirit; or the cadmium salt first added, and the powdered potassium salt afterwards. The reason is, I believe, a double and more soluble salt is formed. This film is in a more expanded state; and the particles of iodide are separated, similar to the particles of sand in a new sponge, which feels gritty everywhere, but when washed out are in a very small proportion; consequently the light can penetrate, and it gives a more intense picture. I am aware that some operators find a difficulty in coating large plates with this collodion; but I think this is due to their method of manipulating. I have seen them directly they have covered a glass pour off the collodion, and, tipping the plate into a vertical position, hold it so, merely rocking it from side to side until the collodion has set; consequently the collodion drags and sets in ridges, disintegrating the film, and giving the iodide a granular appearance at the lower half of the plate; instead of which, if the plate be tipped at a low angle, not more than 45°, and gradually low-

ered as the film sets, running the finger, or, better still, a roll of bibulous paper, along the edge, a ridge of not more than ¼ in. will be left, which will be lost in the slide. I do not mean to say the same thickness of collodion should be used for small as for large plates, or that the season of the year should not be taken into account, but it will be found the nearer the collodion approaches to this state the better it will be for all wet pictures. The proof of a good collodion I hold to be this, that when under-exposed it will give a weak impression all over; with more exposure, a little stronger; at last approaching to the contrasts of nature; then, the middle tints getting stronger, the high lights remaining the same until universal solarization, that no matter how long it has been iodized, it will work still the same, only requiring longer exposure. A bad collodion, on the contrary, gives only a weak picture when newly iodized; when older, gives strong high lights, which a longer exposure only renders more opake, and with weak middle tints, never with any exposure getting much stronger than a positive.

I now return to the porous collodion: it appears from what I have already said, and from Mr. H.'s experiments, that even this is not fit for the dry process with being slightly gelatinized; but, unfortunately, the more gelatinous is the film, the more it shrinks in drying, and is less able to recover itself afterwards for the development. Hill Norris's process is not so bad in this respect as Fothergill's; but the plates are much more difficult to prepare and dry even; they are also much more liable to blister, but then they expand better afterwards, and develope more readily. I think a mixture of the two, or the addition of 2 or 3 grs. of gelatine to the albumen of Fothergill's, might be an improvement, and cause it to develope quicker. It is in consequence of not readily producing intensity that Mr. H. has been obliged to bring about a decomposition of the pyroxyline with potash, forming an organic salt with that alkali to afterwards act on the silver. It has been doubted by some whether such salts as albuminate of silver, &c., do exist at all, and whether they are not the imagination of some chemical brains. That such do exist, I think can be easily proved. It was only at the close of the last session of the Society that we were all startled in this room by a gentleman, well known for his make of first-class chemicals (Mr. Williams), announcing that in distilling a quantity of the residues of old collodion he had found a large quantity of oxalic acid, most likely in the state of an alkaline oxalate, which he separated by decomposing into oxalate of lime; but our wonder will cease when we reflect that all the organic radicals, such as amide, oxamide, acetyle, &c., consist of carbon, oxygen, and hydrogen, which we have in pyroxyline, with the addition of nitrogen also, and which are liable to be found in the decomposition of the unstable materials of which collodion is composed. A case in point will illustrate the part an organic element can take in a process. In a portrait establishment where I was lately at work we endeavoured to obtain greater intensity on plates developed with iron; by coating the plate previously with albumen by the plan of Mr. Law. At first it did not promise much success; but after a few days we were surprised to find a very great increase of intensity, fully equal to pyro. In a few days after, the bath fogged all over, and a new one was prepared, when the result was precisely as before, the intensity only appearing after the bath had been in use some days. Happening to run short of coated plates, an uncoated one was taken up, when the result was equally good. It then struck us it must be the albumen in the bath; and to prove this a new bath was prepared, having the white of an egg beat up in the water of which the bath was made up. This answered admirably, and some beautiful pictures were taken; but the bath so rapidly fogged, it was obliged to be given up with regret. There is thus no doubt of the action of these organic elements—that they not only act the part of acids and form salts, but also double salts, with the iodides, bromides, &c., of silver. The study of the exact nature of collodion and its decompositions affords a fine field for the experimental chemist; but it requires intense perseverance; for when we think we have grasped a point, dozens of others start up, and what we think and hope is the end of our labours is but the beginning.

Mr. Hughes, without taking up exactly the line of argument which Mr. Eliot had pursued and Mr. Davis had commenced, would endeavour to call attention to the exact point as far as it appeared upon the general practical part of the dry process. The Society must be indebted to Mr. Hardwich for devoting his philosophical attention to the subject at this time, when the variety of processes was so great as to become almost nauseating. He thought involved in Mr. Hardwich's paper was this point, although Mr. Hardwich had not called attention to it. Usually these preservative agents had been considered to serve the purpose of holding the plates in the same condition as in the wet process. Now, coming to that hard, horny condition of film which resists the action of the developing agent, he thought Mr. Hardwich had shown that the preservative agents, innocent and innocuous as they had been supposed to be, had other very important chemical functions, which must now be studied in reference to their action. Mr. Hardwich had shown that they contained far more properties than they had hitherto received credit for. They all of them, more or less, contained organic substances which united with nitrate of silver, forming a new compound, which ultimately affect the picture. Mr. Hardwich had also called attention to the curious part the chlorides and bromides play in the dry processes in contradistinction to the wet processes. We all know that bromides and chlorides afford obstacles to the development in the wet, but that they are of assistance in the dry processes; and of that no explanation has as yet been attempted. It was now also proved that the preservative agents themselves, which were usually considered as acting only mechanically, performed a chemical part, and that the very collodion itself, apart from the action of the iodides, bromides, and chlorides, was sensitive to light, and modified the ultimate image.

Mr. Malone stated that, Mr. Hughes having spoken of the plural *we*, he rose to say he did not consider that the albumen, gelatine, &c., act in all cases simply in preventing the attainment of the horny condition. He thought, even apart from any functions they might play in combination with nitrate of silver, that preservative agents kept the film in a moist condition of aggregation. If chloride of silver were precipitated from nitrate of silver in the ordinary manner, and then boiled while it was still moist with caustic potash, it would be very readily decomposed; but if it were allowed to dry, the act of drying would alter the physical aggregation of the particles, and they would therefore not readily yield to the action of chemical agents. With regard to the observations of Mr. Hardwich, in the latter part of his paper, with reference to the combination of nitrate of silver in organic matters, the subject was not altogether new to him (Mr. M.), and he must take some blame for not introducing it before, but that he could not devote himself wholly to photography as Mr. Hardwich did. Mr. Fox Talbot informed him that in making experiments with sheets of gelatine for negatives and positives he found that by immersing the gelatine in nitrate of silver he could get the nitrate to unite so that he could wash, dry, and subsequently procure a picture. He purposely placed a surface of

albumen on a weak solution of 3 grs. of nitrate of silver to the ounce; the plates so coated were dried, and then covered again with albumen, subsequently coating upon the albumen a solution of syrup of iodide of iron. The surface being thus prepared, the plate was finally immersed in nitrate of silver. There was a surface of nitrate of silver with albumen below all, and to this day we did not know the functions of that particular layer of silver: that part of the subject is still mysterious, and requires further investigation. He thought it was Mr. Fox Talbot who opened the door in that direction. Referring to Mr. Fox Talbot's processes, Mr. Malone stated that in 1851 he took up his experiments, and added to the white of egg (which every one knew contained common salt) some nitrate of silver, and got a precipitate which he stirred in the bulk of albumen and found it redissolve. Of course it became puzzling, and he did not know whether to this moment anybody had fully accounted for that class of facts. We call a substance gelatino-nitrate, and so on; but it was usual, in examining chemical bodies and salts and giving them names, to be able to separate them in a state of purity, and it happened unfortunately that a large class of photographic substances could not be crystallized out. Here is an inherent difficulty which might not be overcome; but that is the problem. Until the substance is so constituted that it can be converted and brought back again and analysed into its exact constituents, we cannot accurately give it a name. Sulphuric acid can be prevented, by the presence of alcohol, from being precipitated by baryta, and in this way we have got the sulphuric acid combined with the base of alcohol and baryta-salt, which does not give a precipitate or troubled appearance. This difficulty was well known to chemists in their ordinary operations, and this part of photography was a further exemplification of that difficulty. Another point to which he would direct attention was the influence of organic matters upon the colour of the image, and in that he thought Mr. Hardwich had done good service. Pyroxyline was not a substance, as far as he could judge at present, that he could prepare in that definite form that he could oxide of silver and oxide of lead, and other substances. Pyroxyline contained other organic substances,—the elements of cellulose combined with a given quantity of the hyponitric acid; but by adding potash we get rid of a portion of that hyponitric acid, and obtain nitrite and a new pyroxyline. As long as they proceeded in that manner and produced compound things with such facility, he, for one, would say that he could not see his way out of the difficulties, and it was useless for one to say this or that collodion is the best: one experimenter names the quality of the image with reference to his particular pyroxyline, and so on; and that may be very well for his purpose; but he must decide further whether his collodion will keep any long time in carrying it into a hot climate and under other conditions. We should deal very cautiously, and not attach undue importance to any new recipe or statement until the whole subject is thoroughly sifted.

Mr. Hughes stated that it was known that in the Taupenot process the preservative agent did play an important part

Mr. Shadbolt stated that it was exactly upon that point that he differed from Mr. Hughes. It was recognized before Mr. Hughes's point was, that the special novelty of Mr. Hardwich's paper was the recognition of the fact that the compound of organic bodies with nitrate of silver played an important part. The truth was that the first inkling of that was propounded at Manchester by Mr. Young, when he found that it was possible to dissolve out the iodide of silver from an exposed plate prior to the development of the image; by found that if there were any organic matter in the preservative agent, he could get his image just as readily and quickly either way; but, supposing there had been no preservative agent used, and simply ordinary collodion, if he attempted that upon the wet plate, he could not get any development after the removal of the iodide of silver. The matter was also brought forward at the North London Association at the conclusion of last season—that is, somewhere about May or June—and it was discussed there, and he thought that they all came to the same conclusion, that is, that it was due to the presence of organic matter and silver in some form or other. As to Mr. Hardwich's paper, he thought there was some error in Mr. Davis's notion of what was recommended: he (Mr. S.) did not understand Mr. Hardwich to recommend the powdery film, but merely to state that it had been recommended; but he advised the parchment or horny film, although there was a little obscurity about that; he recommended the parchmentized collodion, but modified by the action of free alkali, consequently bringing it into the condition of a compound between the collodion thus modified and the nitrate of silver. Now he would suggest to Mr. Hardwich that, if this theory should be a sound one, he should try the experiment suggested by Mr. Young, upon a wet plate without any preservative agent whatever, and then dissolve out the iodide of silver prior to attempting to develope the picture. If he can develope it subsequently, it will go far to show that the theory now propounded of the nitrate of silver being the cause of getting the image is the sound one. Mr. H. also laid some stress on the formation of nitrite of silver. We want two kinds of silver salt at present, and it did not appear to be of very much consequence what those two kinds of silver salt were, and he believed that point was first propounded by Mr. Hanaford at the North London Society. While hearing Mr. Hardwich read his paper another point struck him, and that was as to the two quantities of mixed acids—he talked of subjecting the parchmentized paper or the pyroxyline first made to the same acids under different proportions. Mr. Shadbolt took it that the omission of the water in the second formula given by Mr. Hardwich was intended to bring the nitric acid into the same condition as it would be in the quantity of sulphuric acid of the previous formula: in one case he says three measures of sulphuric to one of nitric, adding a certain quantity of water, and in the other he says one of sulphuric to three of nitric acid without any water, the object being to abstract water. Other gentlemen who had spoken had taken up the points upon which Mr. S. had made memoranda; he therefore concluded with the suggestion to try the experiment to which he had alluded.

Mr. Crace would have been happy to have heard the opinions of those gentlemen who during the last season had practised the dry process in the camera. There were several specimens upon the table in which different processes had been adopted, but they emanated from one gentleman, and it would have been more satisfactory if different gentlemen had furnished the result of their experience. There was an aspect of the matter which he thought would be attended with advantage, if, instead of first of all preparing an iodized film and then using a silver bath, there might by possibility be a form of preparation combining the silver bath and the preparation of the film in one—he thought Mr. Lyte specially alluded to something like that. Surely this, carried out successfully, would be an important step in photography; and he should be glad to hear from Mr. Hardwich whether he thought there was any possibility of obtaining such a result.

Mr. Shadbolt stated that that very question had been already answered by Mr. Mayall some years ago. The first dry collodion plates brought before us were by

Mr. Mayall, using a bath of nitrate of silver in which albumen had been previously placed.

The Secretary stated that Mr. Barnes, who was ill, had requested him to read the following:—"The principle of obtaining dry collodion pictures proposed by Mr. Hardwich is not the one I should now even think of following. The most economical way with reference to ease of manipulation, time occupied, &c. of producing prepared plates that may be relied upon is to proceed as follows: to coat the glass in the first instance with as delicate a coating of albumen as it is possible to obtain, drying off rapidly by the fire; to employ collodion in its most perfect state, free from decomposition; the iodizing solution to be that found to work best with the wet process. I give the preference certainly to iodide of potassium used alone, and not in combination with any other iodide. The plate to be sensitized in the usual way, and thoroughly well washed, to free it from every trace of nitrate of silver, then washed over with a mixture of equal parts of the albumen previously used, and of the ordinary pyrogallic developing solution, and finally dried. Plates thus prepared will be rapid in action, will bear any amount of washing, will not blister or crack during development, or whilst drying off. Although I have produced satisfactory results by my method of working, the process is still open to improvements, the most essential being the lessening the time of exposure—the discovery of a means of obtaining power without the use of silver in the developing solutions, and of increasing the rapidity of the development. These improvements, however, depend upon experiments connected with the wet process. I may mention that I already obtain stereoscopic pictures in ten seconds on the average."

Mr. Shadbolt thought that to Mr. Barnes was due a great deal more credit than was given to him; for he first of all produced a presentable dry plate. He stated that if a plate were coated with a thin film of albumen, and dried, afterwards coated with collodion, sensitized, exposed, and developed, the image would be found *on the film of albumen*, as could be proved by removing the whole of the collodion. [In answer to Mr. S. Davis as to the removal of the collodion, Mr. Shadbolt said,] If the plate be first of all coated with albumen, and then dried, and then coated with collodion, it is very easy to remove the collodion by a little pledget of cotton dipped in alcohol; and it is very easily removed then, because the albumen is rendered insoluble by immersion in nitrate of silver.

Mr. Malone said that Mr. Fox Talbot found that pictures by his mode would bear rubbing with cotton wool thoroughly. As in Mr. Shadboldt's case, there was a lower film of albumen, charged with nitrate of silver; then, over that, was another film of albumen, upon which syrup of iodide of iron was poured; then a second dose of nitrate was used: yet, notwithstanding these conditions, the upper surface of iodide of silver had not the permanent image, and was often smeared and dirty; it was necessary to rub that off; then the real image was found to be on the lower film. He found, experimenting a long time since, that a bath that had been used for dipping albuminized plates, and used for some weeks, came afterwards to be used for the French-paper process; that paper, excited in this bath used for albumen plates, gave an image in dull weather in far less time. There again was an action which we little anticipated; we should have expected it would have retarded it. But we never succeeded in making again a bath of that character, which shows that we have got a great deal of work to do in all directions; and it would now be desirable to try Mr. Barnes's plates, and dip them in such a bath, and see whether it increases the rapidity of his process.

Mr. Shadbolt drew attention to the fact that he saw some pictures in the Glasgow Exhibition last year, produced by Mr. Kibble, of that city, with a twentieth part of a second's exposure upon a dry film of large size with a single achromatic lens with a focal length of 6 feet.

Mr. Watson did not agree with Mr. Hardwich, that either the iodizer or iodide-receiver was upon the surface; he thought it was imbedded in the collodion, and he would engage to produce from any kind of collodion a picture that you could rub off entirely from the surface; but that was not iodide. He supposed the nearest approach in name would be an oxide; and that he had found especially to occur in the dry processes, when using too much silver in order to hasten the development. The picture is produced more rapidly, but not more satisfactorily; for if you touch it with your finger or a little cotton, it will rub it entirely off; but with the very same collodion you can have the image in the body of the collodion, so that when it is dry you may rub it with your finger and give it a burnished appearance. He had one or two plates there to give a proof of that. With the same collodion he had had the picture upon the surface, and, as was seen there, in the body of the collodion. He had never tried to produce collodion in the way that Mr. Hardwich advised—he had always produced it in a way almost the opposite, and he found that, instead of the washed plates being slow in development, for dry plates he thought they were exceedingly quick.

Mr. Lyte asked whether Mr. Watson used albumen or gelatine.

Mr. Watson always used albumen in preference to anything else, because it gave a decided firmness to the film.

Mr. Malone thought he could clear up what appeared a discrepancy in the mind of the last gentleman who had spoken. From his (Mr. M.'s) experience in albumen, he thought it might be explained. He exposed the film to the vapour of iodine, which produced a deep orange colour; that was immersed in nitrate of silver; by developing with gallic acid he got a negative image, which he should describe as in the film; but on developing with gallic acid and with more nitrate of silver, he then got, piled up, an image on the surface like the daguerreotype. That was a surface image; the change was carried on out of the surface of the plate. The silver so piled up was, of course, loosely adherent, and could be wiped off. If they used a strong solution of nitrate of silver in the first place, they produced the spangles of surface silver at once, and then continued to heap it up in the metallic form; and he thought, taking into account the difference of little or much silver in the developer, it would be seen there was no great discrepancy in the matter, that Mr. Hardwich might be right, and that the collodion should contain sufficient porosity to allow the development to go on within it.

Mr. Watson thought Mr. Malone had misunderstood what he had said, or perhaps he had not explained himself clearly. Mr. Malone appeared to think he (Mr. W.) meant that the picture on the surface could be burnished. If it were attempted to rub such a surface as that, the picture would be destroyed, with a mark all over it, simply because the picture was powdery on the surface; but it was when the picture was in the body of the collodion that it could be burnished.

Mr. Malone made all his experiments with an agate burnisher on the surface image.

Mr. Hardwich said he had dotted down a few notes upon the remarks that had been made by the different speakers, and he would reply to them. He understood Mr. Davis to ask why did not he (Mr. H.) first im-

merse the cotton wool in the parchmentizing sulphuric acid, instead of putting it into a solution of sulphuric and nitric acid? The reason was, that a small portion of nitric acid was necessary to prevent solution of the cotton in the acid, as would be found on trial.

Mr. Davis had inquired also, was penetration necessary to development? Mr. Hardwich believed that it assisted the development; but it seemed to him that in the case of the horny film the image was very nearly on the surface; therefore, although penetration was useful, he thought it quite possible to develope an image almost, if not entirely, superficially. Now, was Fothergill's process a slow one in developing? He recollected a letter he had received from a good observer, who said he had succeeded with the Fothergill process in stereoscopic plates, but not with large ones; and his own idea was that there would be a difficulty when you used a lens of a long focus and newly-iodized collodion. He had never seen the water-markings spoken of, but he agreed with Mr. Davis in thinking that the proper way to avoid the brain-like markings on the sky was to keep the developing solution moving, and he did not suppose that doing so would affect the delicacy of the picture.

With reference to Mr. Eliot's observations, he did not think that Mr. Eliot quite entered into his views on the chemical state of the collodion film. Mr. Eliot described a process some time ago for purifying old baths; and, in following that out, he (Mr. Hardwich) had found that the precipitate was a chemical compound of citrate of silver and iodide of silver. In the case of gelatine and other substances, he found also a chemical combination. In dry processes it was best to have a collodion in a condition to form this double compound—one in which the pyroxyline itself was capable of abstracting nitrate of silver from the bath, and then entering into some kind of combination with a portion of the iodide,—not, however, with the whole of the iodide, for there must be an excess, in order to give creaminess to the film. He had made pyroxyline with a strong nitro-sulphuric acid almost at the boiling point; and in that case he thought he obtained a portion of nitro-glucose. This film was in a measure independent of the albumen or other preservative.

As to Mr. Hughes's remarks as to the action of chloride, bromide, and iodide in the wet process and in the dry being exactly opposite, he perfectly coincided. It was known that a compound existed named iodo-nitrate of silver; but if the attempt were made to put in chloride instead, it did not succeed, for no definite chloro-nitrate of silver had been described. It was a fact, however, that nitrate of silver in union with these organic matters combined more decidedly with chloride of silver than with the iodide of silver, so that the chloride might be expected to act differently in the dry process.

Mr. Malone's observations upon the change in the drying of the chloride of silver were very interesting. That molecular conditions had a great deal to do with the result was evident, but he scarcely knew how much. The Members would see by the test-tube he held in his hand that the chloride of silver in the gelatine solution was very finely divided. He himself had always been a supporter of the chemical, in opposition to the mechanical view of those changes; but he had no idea of seeing only one side of things, and was open to entertain any reasonable hypothesis.

Mr. Shadbolt spoke of his (Mr. H.'s) using two acids. The paper which he had the honour of bringing before the Meeting was simply on the *theory* of the subject, and he did not wish to say that all that it contained was good in the way of practical directions. It was important to ascertain precisely what part the sulphuric acid, and also the nitric acid, played. Last year he obtained collodion in London perfectly powdery, yet the negatives were so extremely weak that it was impossible to work the collodion, the skies being imperfect. Soon afterwards he received a letter from a gentleman at Madeira who said he had used the same collodion, but, curiously enough, could not succeed with it in Fothergill's process. He (Mr. H.) had no doubt that it was made with very weak nitric acid, since there was scarcely any power of setting, although the proportion of alcohol was not greater than he himself used in collodion which set very rapidly.

Mr. Crace inquired about adding organic matter to the bath. He (Mr. H.) must say that he had had severe experience of the uncertainty of that method. He once used *Glycyrrhizine* in the bath, got an excellent picture on Monday, but on Saturday a reversed action of light, producing a transmitted positive instead of a negative. The organic substance ought to be in the collodion; and, if possible, it must be something which cannot dissolve out into the bath.

He was very glad to see that Mr. Barnes had entered into the discussion, and had sent so many negatives. These plates were of the proper size, and not small stereoscopic plates. He only wished that Mr. Barnes had been present.

Mr. Barnes.—"I am in the room and will answer any questions."—Mr. B. then went on to say that he did not think they would succeed by the Fothergill process with larger plates than 10×8, and then not with more than six out of a dozen; the film would tear off when dry, after the picture was completed. There was one on the table which had curled off the plate whilst he was in the dark room washing it; he had a solution of gum; and touching the edge of the glass-plate with the gum, that prevented it from coming away. In some instances he had seen pictures 10×12, though in every other circumstance perfectly satisfactory, completely spoilt by curling off the plate, just sticking in particles. The greater proportion of the negatives on the table were produced by first coating the plate with albumen, it did not matter how thin. The Fothergill process was little more than a copy from the first pamphlet published by him five years ago. He had in his hand a transparent positive produced by Mr. Watson; and in his remarks he (Mr. W.) said that the process gave a rapid development. If it was a positive on glass printed from a negative, we could easily understand that. In the case of a camera-picture it was a very different matter.

Mr. Hardwich said he certainly thought they ought to thank Mr. Barnes for bringing plates of a large size, since they wanted to know what the dry process would accomplish when long-focus lenses were employed. He might take that opportunity of saying that he had always valued Mr. Barnes's work most highly, but he did not agree with him in thinking that they ought to regard the Fothergill process as a copy of something published in the first edition of Mr. Barnes's work. It behoved an inventor, if he wished to claim the full credit of his invention, to distinguish the essential from the non-essential; otherwise those who followed him, if they took up any point and clearly elucidated it, would have the credit, although the thing might have been indicated or alluded to before. In photography it was impossible always to ascertain who was the first inventor. Except Archer's collodion and Mr. Fox Talbot's discoveries, it was difficult to trace anything exactly. He thought they must all work together in trying to perfect this beautiful art, and then doubtless all would obtain a share of the credit.

To continue his reply to the observations last made by Mr. Malone and Mr. Shadbolt, as to the image being always in the albumen, it appeared to him that the image would be usually in the organic preservative which was uppermost. Each organic substance gave

an image of a peculiar colour. In the case of albumen it was of a yellow tint, but in that of gum arabic, often of a ruby-red: now if he laid gum at the top of the albumen he obtained a red image, and not a yellow. When collodion is spread upon a film of gelatine instead of simple glass, the film is not quite so creamy in the bath, and on developing there are indications of the gelatine producing an effect, for the image is rather more intense. If now a coat of gum be applied over the collodion, the image is in the gum, and not in the gelatine, as far as can be judged of by its colour.

Mr. Russell Sedgfield exhibited a series of very fine stereographs, which he had lately taken.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

Ordinary Meeting,

13th December, 1859.

W. Scott Elliot, Esq., in the Chair.

The Minutes of the preceding Meeting were read and approved.

The following gentlemen were balloted for and elected Ordinary Members of the Society:—Dr. Simpson, H.M.I.S., Mr. A. Falkener, Mr. F. Hallard, Rev. Dr. Hodson, Mr. D. C. Connell, Mr. R. Pope, Mr. J. Kirk.

A communication was read from Mr. John Sang, "On Printing Frames." Specimens of the various kinds described in the paper were exhibited to the meeting.

Photographic Printing Frames.
By Mr. John Sang.

The accompanying specimens of Printing Frames are laid before the Photographic Society of Scotland at the request of the Honorary Secretary. They were made of their peculiar form with a view to enable the workman to produce a large number of prints day by day. The number of prints which can be produced in a day does not altogether depend on the brightness of the light—in fact, does not very materially depend on that circumstance; supposing the workman to have abundance of negatives and printing frames at his command, it depends more on the speed with which he can place the sensitized papers in the frames. With a large supply, a workman can go on producing daily pretty nearly the same quantity of work: in bright weather he uses fewer frames, because he is unable to change the sensitized papers of many with a speed proportioned to the short time required to make the impression; in dull weather he employs more.

These frames were constructed on the idea of having them to shut by means of a spring catch, and of using no other glass than the negative itself, thereby allowing of its being wiped in dull weather without withdrawing it from the frame, and of avoiding the injury to the surface which constantly takes place when two plates of glass are pressed hard on one another. Before arriving at their best form, as represented in the drawing and exemplified in sample No. 6, with the performance of which the young people employed to print were quite satisfied, they had gone through some alterations suggested by a pretty extensive use; and a specimen of each of the forms is laid on the table of the Society.

In No. 1, after the sensitized paper is put on the negative, a cushion is laid above it, and the lids are shut with the catch-springs. These frames answer well when new; after having been used for some time the hinges wear slack, and it is necessary to fit them with steadying pins, as in this sample, to prevent the paper shifting when the frames are moved about on the exposing bench. They were, however, inconvenient from being too bulky, so that a boy could not, with safety to the negatives, carry more than five or six in his hands from the dark room to the bench.

In No. 2, which, like No. 1, is made of wood, the separate cushion is dispensed with, and is replaced by two pads fixed on the covers. The hinges are made so as to be capable of being tightened up on wearing, and the glass and print are brought nearer the surface, and are more accessible. They were found also to be rather bulky, but in other respects answered well.

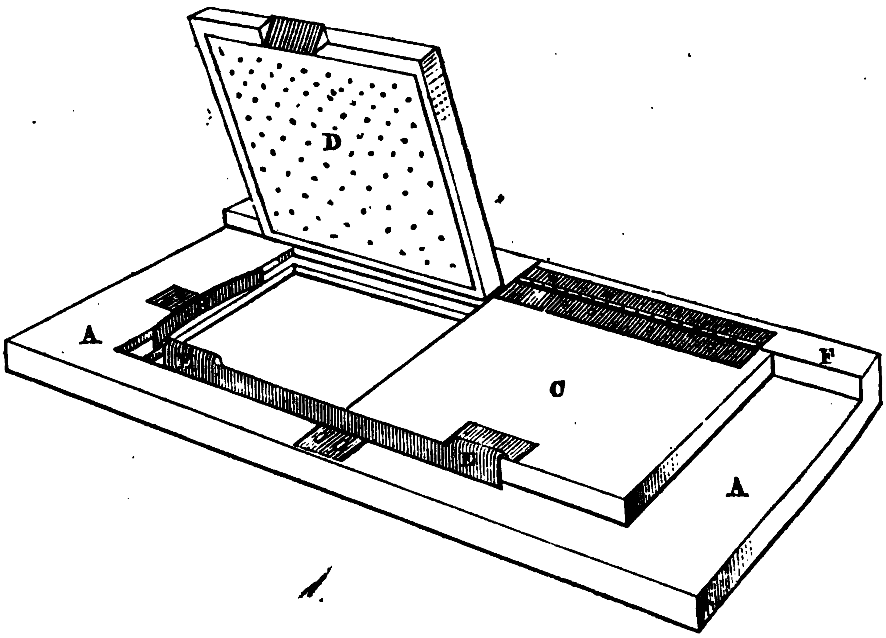
No. 3, the next form, has also the cushions fixed; it is made of millboard, is very portable, and was found to be convenient. The hinge, being of leather, scarcely allowed of a shake sideways, and no steadying pins were required; but, when used for a length of time, the covers became bent, and the cushions required occasionally to be altered in shape.

No. 4 is an improvement on No. 3, by means of altering the manner in which the leather hinge is fixed, so that the cover does not bend through use. This form left little room, it was thought by the printers, for further improvement.

No. 5 is a trial sample of a frame made of tinned iron. It was made of this material for cheapness, but was found to be bad on account of the back of the glass being too much exposed, and liable to be scratched or broken in carrying it from the dark room.

No. 6, the last form of these frames, differs from No. 4 only in the hinges being of brass instead of leather. The hinges are made of thin sheet brass, folded up over a central wire, with the view of their being less liable to wear slack than the common strong drilled hinges, such as are on No. 1.

The best form, No. 6 or 4, is represented in the annexed drawing. The frame, A, A, consists of two pieces of millboard, each about ⅛ inch thick, glued together. The under piece has a hole cut through it a little smaller than the glass negatives; the upper one has a hole as broad as the negatives, and a little longer. The small recess formed on account of the different sizes of these holes when the boards are glued together, forms the seat or shelf for the negative. A brass spring, B, is placed at one end, so as to press against the end of the negative and hold it steady. The cover, also of millboard, is in two parts, C and D, of which C, in the drawing, is represented shut; D is open, and shows the padding, which consists of about three folds of woollen cloth or felt. The covers



re on one side hinged to a strip of millboard, F, of their own thickness, glued along one side of the frame; and on the other they are held down, when shut, by a brass spring, E, E, whose ends are bent downwards, so as to catch the ends of the covers, bevelled there, and protected by a bit of thin sheet brass. To shut the covers it is only necessary to press them down; and to open them, to press the spring aside by the fingers.

Millboard was preferred for the material for the frames, as being thin, cheap, and capable of being made up by the boys engaged in printing in their spare time. The degree of elasticity which it possesses was found in practice to be rather an advantage than otherwise.

The following communication was then read:—

On an Easy Method of Recovering Silver from Old Nitrate Baths. By B. Simpson, M.D., H.M.I.S.

As far back as the 7th February, 1843, the late Professor William Gregory read a paper before the Chemical Society "On a Method of Obtaining Pure Silver;" and, as I believe the method therein described is unknown to many photographers, especially amateurs, I hope I may be excused for introducing the subject to the notice of the Society.

Those who practise the collodion process on a large scale must be well aware of the expense of nitrate of silver baths; and it is an object of some importance to be able to turn them to account, after they have become useless for sensitizing plates from protracted use, &c. It is with a view to this very desirable object that I mean to trespass on the Society's time for a few moments this evening.

The first step in the process, then, is to obtain the silver in the form of chloride. This is a very simple process, and can be most conveniently done by adding a strong solution of common salt to the silver bath till a precipitate ceases to form.

The next step is to obtain the silver in the metallic state, or in the form of oxide, from the chloride, and this is the part of the process to

which I wish particularly to direct your attention.

Several methods have for a long time been employed for effecting this purpose, of which, however, the two most in use are the metallic zinc and sulphuric acid method, and fusion in a crucible with carbonate of soda or potash, or a mixture of both.

These processes are described in Mr. Hardwich's book (page 495), and also in other works, but in ordinary hands they are very liable to fail, and, in Dr. Gregory's own words, require much experience and dexterity. This remark applies especially to the method of fusing with carbonate of soda or potash; as, if the heat be insufficient, the silver is spread in small globules through the mass, whereas if it be too great the crucible may be rapidly corroded by the alkali, and the whole of the contents lost. Those who wish to obtain the silver chemically pure should, in my opinion, avoid the zinc method, as being very tedious, and seldom complete. Dr. Gregory says he never succeeded in obtaining a colourless solution of nitrate of silver by this method; and from what experience I have had, I must allow that it is very difficult to remove the last traces of zinc.

Dr. Gregory's plan is the one which I have now for some time adopted, and with complete success. It recommends itself on account of extreme simplicity, certainty, and rapidity, and with ordinary care entails no loss.

The chloride is well washed by decantation with hot water. It should also be broken down with a glass rod or a feather during the washing, so as to get rid of all lumps, which would retard the action of the reducing agent. The chloride, while still moist, is covered to about half an inch with a strong solution of caustic potash (specific gravity 1·25 at least), and then boiled. The boiling may be performed in a capsule of silver, platinum, or clean iron (a porcelain evaporating dish or a Florence flask will answer the purpose very well). During the boiling the mixture is to be well stirred, in order to bruise all lumps. In about ten minutes the mass has become black. If, after a short time, a small portion taken out and washed is not entirely soluble in dilute nitric acid, the potash is to be decanted off, and the powder well rubbed in a mortar. Then return it to the capsule or flask, and boil again with the same or fresh potash, which will complete the reduction. When a small portion of the powder is entirely soluble in nitric acid, the process is complete.

The oxide now obtained must be thoroughly washed by decantation, first with hot, and afterwards with cold water, and the last washings ought to be with distilled water: all except the first may be conducted on a filter. The washing may be considered complete when the filtrate ceases to precipitate on the addition of a drop of nitrate of silver solution. The nitrate of silver may be obtained with great facility from this oxide by addition of nitric acid, which completely dissolves it, and evaporating to dryness, to drive off the free acid.

I am much surprised that the above process is not more generally known and practised; and I think we are much indebted to the late Dr. Gregory for placing in our hands so simple and economical a method of obtaining pure silver. I have given his process almost in his own words, and I can speak from experience of its simplicity and rapidity. It only remains for me to add, that the oxide of silver obtained by the above process may be reduced to the metallic state by the mere heat of a spirit-lamp, or by the addition of a small quantity of common powdered white sugar, by degrees, during the boiling.

To conclude with the Professor's own words: "In order to give an idea of the ease with which the whole is performed, I may mention that I dissolved half-a-crown, and obtained the whole of the silver it contained, by the above process, *within two hours* in a fused state. It is particularly to be noticed, that if the chloride *have once been dried*, it is with great difficulty decomposed even by a long boiling with potash."

Mr. J. T. Taylor said he employed with perfect success a process for the recovery of waste nitrate, which was still more simple than the one described by Dr. Simpson. It consisted merely in putting a piece of copper into the silver solution, which effected a decomposition, and formed nitrate of copper and metallic silver. Mr. Taylor exhibited to the meeting the process, which was completed in a few minutes.

The thanks of the meeting were voted to Mr. Sang and Dr. Simpson for their communications.

Ordinary Meeting, Jan. 10, 1860.

W. Walker, Esq., in the Chair.

The Minutes of the preceding Meeting were read and approved.

The following gentlemen were elected Ordinary Members:—Mr. Thos. Pearce, Braemar; Mr. J. Stuart, Inverness; A. Claudet, Esq., F.R.S., London.

The Chairman announced the resolution which the Council had come to regarding the mode of deciding the competition for the prizes offered for the best pictures in the Exhibi-

tion. He said that, as there were certain disadvantages attending the mode which had been adopted last year (viz. by the votes of the entire body of the Members), it had been considered advisable to adopt some other plan on this occasion. Two others had been considered, the first being to appoint a Committee to make the award, and the second to place the matter in the hands of one person only, with full power to make the award according to his own judgment. After a lengthened consideration of the subject, the latter of these two modes had been unanimously adopted by the Meeting of Council, and they had accordingly appointed Mr. Horatio Ross, one of the Vice-Presidents, the Judge in the competitions both for the Society's Silver Medals and for the Maconochie-Wellwood Prize, which is to be awarded this year. Mr. Ross had been since then communicated with, and he had agreed to act as Judge. His award will be intimated at the next Meeting, in February. In making this arrangement (the Chairman said) the Council have no doubt that it will give satisfaction. Mr. Ross is one of the earliest and most enthusiastic photographers in this country, and being, besides, the originator of the scheme of offering medals as prizes for the best pictures in the Society's Exhibition, the Council felt confident that they could not act more appropriately, or with more advantage to the Society and to the competitors, than by placing the award of the medals entirely in his hands.

Dr. Paterson read a paper "On a New Dry Collodion Process, as successfully practised during last Autumn." [This paper, and the discussion which followed it, will appear in the next Number of this Journal.]

At the suggestion of the Chairman, a Committee, consisting of Messrs. Watson, Herries, Tunny, Orange, and Dr. Paterson (Mr. Watson, Convener), was appointed to examine and report on such of the Dry Collodion processes as they deemed it expedient to investigate, including that of Dr. Paterson.

After a vote of thanks to Dr. Paterson for his communication, the Society adjourned.

Exhibition of the Photographic Society of Scotland.

THE Fourth Exhibition of the Photographic Society of Scotland opened on Saturday the 17th December, in Mr. Hay's Art Saloon, George Street, Edinburgh.

The present Exhibition not only maintains its ground, but is in several points an advance on the Exhibition of last year, interesting and varied as that was. Its principal feature is the preponderance of studies from landscape proper, as distinguished from mere architectural subjects, though this latter branch is very adequately represented in the contributions both of foreign and domestic photographers. Hence there is an infinitely greater feeling of variety and novelty in the present Exhibition than in any of its predecessors. Wonderful as is the beauty of detail and charm of correct perspective which may be obtained in views of streets or edifices, a certain monotony infallibly attends their reproduction. Even the stately palaces of the Grand Canal, the quaint Middle-Age architecture of Nürnberg, Ghent, or Brussels, and still more the cathedrals of our own country, become wearisome when year after year they reappear on the walls, delineated from the same points of view, and under nearly the same conditions of light and shadow. We admire them; but we pass on from these old friends, with comparatively a hasty inspection, to some charming bit of nature which we never remember to have seen before, and which comes upon us with the freshness of a new acquaintance. And such is the infinite variety of subjects of this kind which English and Scotch nature present to us almost at our very doors, or within a few miles of our homes, that it is quite impossible that the photographic repertory should ever be exhausted. The simplest subjects are often the most effective when treated with the feeling of an artist and the manipulative skill of a dextrous photographer. A winding road across a common, thick with gorse, heath, and fern, backed by distant woods and low wavering hills; a Devonshire lane with its high and overlacing elms and its network of sunshine and shadow; the sweep of a broad river through an open country; a wheat-field with its tired mowers; an old mouldering mill which has done its work and ceased its functions; a deep glen through which, far beneath, a rivulet is seen wandering; a still pool mantled with water-lilies which break the shadows of the overhanging trees; a solitary churchyard with its grass-grown tombs and their "forlorn *hic jacet*;" some far-receding woodland avenue that brings back the recollections of "As You Like It;" —what county of England or Scotland does not present thousands of such subjects, courting the skilled eye and hand of the photographer, and enabling us, even amidst the smoke, and dust, and din of our great commercial marts, to surround ourselves with a picture-gallery drawn from Nature's quietest and most soothing scenes—to wander among forests and mountain heights, and feel in imagination

"the breath of heaven fresh blowing."

Coincident with this increased direction of

photography towards the field of general nature in preference to merely architectural subjects, and perhaps to some extent also the cause of that movement, has been the increased efficiency of those instruments which photography is now enabled to employ. We do not speak of lenses,—for their peculiar perfection is most felt in architectural subjects, and least in views of wood, water, and other subjects in which the slight curvature of lines is immaterial,—but of those more rapid agencies which the progress of the science has rendered practicable, and the finer material on which the outlines, which the sun traces, are received. We allude particularly to collodion, and in that peculiarly to the wet processes. No one can more cordially admire the results of the paper processes—the simple calotype or the wax-paper process—than ourselves. For near objects the calotype is admirable. It gives foregrounds and buildings with a beauty of detail which cannot be surpassed except on glass, and it may well be doubted whether any increased sharpness of detail would increase the artistic effect which a good specimen of the calotype process, *as applied to such subjects*, possesses. But wherever the subject embraced a number of receding planes — where, in short, aërial perspective was required, the coarseness of the medium through which the calotype process worked was felt to be a fatal obstacle to success. To some extent this defect was obviated as to distance by the wax-paper process; and some of Mr. Raven's Pyrenean scenes among the gorges of those great passes, with the distant wall of the Maladetta or the Pic du Midi rising beyond, seemed to open up, even on waxed paper, prospects of almost indefinite improvement. Still there was often in the best of the waxed-paper photographs a woolliness and indecision in the outline, while in all of them, in consequence of the extreme length of time occupied in the exposure, that great charm was wanting which consists in the relief, vivacity, and spirit which are communicated by a few human figures *naturally* disposed in the foreground. This last charm, accompanied by a felicity of detail and exquisite gradation of aërial perspective, which emulates the gradual retirement and vanishing of nature itself, the introduction of the wet-collodion process by the late lamented Mr. Archer supplied. Thenceforth the artist felt that all the difficulties of the art, as applied to any subject, were practically overcome. Every aspect of nature,

"From morn to noon, from noon to dewy eve,"

nay, to the last verge of sunshine on the horizon, was placed within the range of this powerful agency, and enlivened by all the sense of life and motion which the introduction of human figures never fails to give.

It may at first sight appear somewhat inconsistent if, while expressing our sense of the increased animation and interest which the introduction of figures gives to landscape, we at the same time express our (not merely indifference, but) dislike to all attempts to make what are called figure-pictures, by arranging groups of persons, in studied attitudes, to represent some scene or action, actual or imaginary. This, we are convinced, is a movement in the wrong direction, whether applied to ambitious compositions like the "Two Ways of Life" of Rejlander, or to the very clever but unsatisfactory performances of Mr. H. P. Robinson in the present Exhibition, such as (No. 60) "Preparing to Cross the Brook"; (No. 252) "Sour Apples"; (No. 441) "The Cottage Window"; (No. 515) "Lavinia"; (No. 470) "Here They Come" (the last being the best of the series). It seems as if it were impossible to communicate to these artificial representations the look of nature: and when, as in the case of "Lavinia," the subject of the representation is of the humblest cast—the very reverse of the poet's "Lavinia"—it cannot but be matter of regret that so much trouble should have been taken where success was impracticable. We regret this the more in the case of Mr. Robinson, because his ordinary landscapes are equal to most in the Exhibition. In particular, his "Norman Doorway, Ludlow Castle" (No. 817), is perfect both in tone and beauty of detail. There are many other photographs of this school of artificial grouping in the present Exhibition—none equal to the "Houseless and Homeless" of last year, but many of sufficient ability to make us regret the skill which has been wasted upon them.

Before adverting to what we consider the gems of the Exhibition, we may notice two pictures on a very large scale, bearing the inscription "Héliographie sur Acier, par Ch. Nègre"—"Sun Engraving on Steel, by Ch. Nègre." One is about 2 feet in length by about 18 inches in breadth; the other somewhat smaller. They represent portions of elaborate architecture; the larger resembling the sculptures on the portal at Chartres. If these be really untouched specimens produced by photography on steel, the question as to the degree of perfection which may be obtained for engraving by this process is solved. The little specimens contributed by Mr. Talbot last year were promising, but these are finished *performances*. As already said, however, we cannot answer for their being wholly untouched.

Landscape is pre-eminently the field of pho-

tography, and naturally claims the first place in a notice of this kind. It is really difficult to adjust the contending claims to excellence of Mr. Lyndon Smith, Mr. Mudd, Mr. Maxwell Lyte, Mr. Fenton, Mr. Henry White, and we may add the name of a new exhibitor, Mr. Dixon Piper. Perhaps the order in which we have arranged these names may fairly indicate their place, though we are aware opinions may be divided between Mr. Mudd and Mr. Maxwell Lyte. Mr. Lyndon Smith, who gained the Society's medal of last year, has now enlarged the size of his photographs, and yet proves that he can carry all the delicacy and retirement of distance into these large studies which so eminently distinguished his smaller performances of last year. Two of his studies, "In the Valley of Desolation," which seems to be an imaginative name for the valley of the Wharfe, are really wonderful (Nos. 485 & 509). From a height the eye plunges down into a wilderness of wood, which seems to retire step by step, shut in by soft hills folding one behind another, till they vanish in the sky; while through glimpses in the trees the stream is seen stealing down the deep ravine. In another (No. 432), an open foreground of heath and fern, fragments of fallen trees, two or three decaying old hawthorns with trunks fantastically bent by the blasts, and the same background of rounded hills, form an exquisite and impressive landscape. His "Approach to Bolton Abbey" (No. 412), though fine, is less pleasing; for the extreme lights on the leaves give a spottiness to the picture, as if the trees were covered with snow. We need hardly say that collodion has been the medium used both by Mr. Lyndon Smith and by Mr. Mudd, whose contributions we have next to notice.

They are of all kinds: architectural, as in the "Old Mill," or (No. 520) the "Old Moat and Bridge at Chorley;" waterfalls, as in that exquisite one (No. 627) "Near Coniston;" fragments of ruin, as in (No. 644) the "Archway at Fountains;" mountain views, as in (No. 774) "Yewdale, with Rascrag in the distance;" or stately avenues in parks where the eye seems to travel for miles under the trees, as in (No. 521) "Dunham Park, Cheshire." It is not possible to carry delicacy of manipulation, artistic treatment, or beauty of tone farther.

Mr. Maxwell Lyte again sends some admirable specimens of Pyrenean scenery, of which the finest, we think, are (No. 781) "Bagnères de Bigorre," (No. 611) "Le Pont de Lieu, near St. Sauveur," and (No. 623) "Le Pont de l'Echelle."

Mr. Fenton's contributions are less numerous this year, but we know not that he ever executed anything more entirely satisfactory than (No. 605) "The Reed Deep on the Ribble, and Penlehill." The sweep of the river into the distant country, the wooded banks and beautifully indicated reflexions in the stream, and the faintly seen mountain in the distance are charmingly represented. The companion picture, entitled "Paradise View on the Hodder" (No. 602), is scarcely inferior. To these may be added the "Interior of the Chapel at Stonyhurst" (No. 596), and that beautiful bit of still life (No. 392) entitled "Sports of Wood and Stream."

Mr. Henry White contributes some fine specimens, such as (No. 401) "A Wheat-field," (No. 525) "Oak Trees and Water in Ottershaw-park, Surrey," and (No. 476) "Road to Queenwood-common." We could wish, however, that the tone of his prints leant a little less strongly towards the red.

On M. Niépce's Re-discoveries.

To the Editor of the Photographic Journal.

Boath, 19th Nov. 1859.

SIR,—I send for publication the fragment alluded to in the P.S. of my letter which appeared in your Journal of Oct. 15th. For the benefit of your readers (though you may already be aware of it), neither of my two letters, nor any notice of them, appeared in the *Athenæum*, because—so its editor wrote me—he considered it more peculiarly your province to take notice of such a case, and had shown my letter and spoken of the matter to some of the members of the Council, who had given him to understand that they were then inclined to do me justice, and repair the injury which they had been the means of doing me, in publicly, and as a Society, bestowing honour and assigning credit to M. N. de St. Victor for what I had previously published.

I enclose at the same time a Report of the criticism in our Society, which, after various delays, was, as you wrote me, omitted altogether, by a mistake of your printer in taking down the types contrary to your desire.

Though having a right to its insertion, I would not have troubled the public with it now, after this lapse of time, did not the conduct of certain persons show that I had committed a mistake in hitherto allowing it to remain unpublished. C. J. BURNETT.

To the Editor of the Athenæum.

Saturday, 26th June, 1858.

SIR,—As you have not yet inserted my letter on M. Niépce's re-discoveries, or taken any notice of the affair, I would wish to make some little alteration in it before you do insert it.

One is naturally unwilling to believe any-

one guilty of unfair play, still more to accuse him of it without positive proof, and I did feel particularly reluctant to come before the public just now as the accuser of M. Nièpce, since it is only a few months ago that I was compelled to occupy the unpleasant place of an accuser in a somewhat similar case.

Since I wrote you, however, having examined more narrowly into the whole circumstances and accompaniments of M. Nièpce's rediscovery, and having had the very decided opinions of some others in the matter, I have been so very thoroughly convinced of the ungenuineness of M. Nièpce's rediscovery, that I think it would be quite wrong, as well as unfair to myself, to allow anything to appear in my letter which might look like an admission that I was satisfied of M. Nièpce's fair dealing.

The perfect correspondence of the *details*, except what have been added or altered for the worse (*e. g.* the water fixing and mercurial toning-bath), apparently merely for the sake of making some little difference, is very remarkable; and the associating the uranic papers with *tartaric* papers, particularly as likely to be of *equal practical value* (a self-evident *and most monstrous absurdity*, dropped at once as soon as it came into practical hands), has too much the air of a blind; while the studious separation of the uranic papers in his theoretical classification (!) from their ferric allies, is quite too much in the same style.

Unless M. Nièpce is to be supposed unacquainted with the ferric processes, with their silver and gold developments, *as years ago published by Sir J. Herschel, and to be found described in almost every work on photography except* the merest elementary single-process handbooks or manipulation-manuals, it is utterly unsupposeable (even supposing him to have been ignorant of the constitutional and chemical analogy subsisting between the ferric and uranic salts) that the perfect correspondence between the developments both by silver and by gold on the two classes of papers could have failed to suggest that the deoxidation so well known to play an important part in the one case was likely to be also present and causally active in the other. But—not to allude to the improbability of the use of a gold developer having ever suggested itself at all to one who prides himself so either in his ignorance of chemistry or *his intentional overlooking of all chemical considerations*, without his knowledge of its having been *previously* employed in Sir J. Herschel's chrysotype—M. Nièpce takes care to prevent our supposing him ignorant of the ferric papers by expressly *alluding to* papers prepared with the iron salts, though only to *contrast* them with the uranic.

There remain to us, therefore, just two suppositions—either that M. Nièpce *has here also*, as in the case of the uranic salts, made an independent rediscovery, and so has not yet managed to stumble on the fact of their deoxidation—or else that, being aware of Sir John Herschel's discoveries, he has some reason in reserve for basing his classification on the less important, to the exclusion of the more important and apparently essential characteristics.

Leaving out of the question in the meantime M. Nièpce's experiments in photography from radiations (suggested apparently by those published by M. Moser of Königsberg, but still containing a good deal that is both new and interesting, and evincing an amount of intelligence and research not very reconcilable with his blunders elsewhere), his experiments on the images developed on various substances after insolation seem to proceed on the plan of trying all sorts of substances at random, without any reference, *first or last*, to their well-known chemical composition or instabilities or analysis, and as a matter of course, and at once, setting down any results obtained as owing to some "wonderful new action of light," the distinctiveness of which from all previously-dreamt-of actions of light would seem to be intended to be defined in these words, that "it is not *altogether* owing to either phosphorescence or fluorescence alone" that the said bodies "possess the power of *somehow* absorbing and *somehow* saturating themselves with light." I am not aware that it had been hitherto imagined that the sensitiveness of silver-salts and other photographicals was owing to phosphorescence or fluorescence; and in the case of the substances most especially named, viz. the uranic salts and the ferric salts, the true cause (*i. e.* the cause as far as we can *yet* go) was, if not known to him, *evident enough* to anyone with half M. Nièpce's intelligence, really wishing to find a cause, or not anxious to overlook it; while, as to the other case, *i. e.* the tartaric acid solution and tartaric papers, what a *marvellous discovery* to find that certain properties possessed (?) by a substance were not owing to the presence in it of certain *other* properties WHICH IT DID NOT possess! *

* The letter then concluded with the following, among other remarks:—"That in mentioning my belief, and giving the reasons for it, that M. N. de St. Victor had not been so independent as he would have us believe, in his rediscovery of uranium-photography, I could not, it was hardly necessary to say, expect the editor (or any one else) necessarily to adopt this view, or do otherwise than form his own opinion from the circumstances and evidence before him ... however strongly they might appear to me or to others to speak."

On Uranium. By C. J. Burnett.

(Continued from vol. v. p. 104.)

Members present would recollect that some months ago he called their attention to the fact, that the new uranium processes brought forward as novelties by M. Nièpce were (with the exception of a mercurial toning-bath of no value, and of substituting plain water in fixing, which destroyed the whole value of the process) nothing else than a literal copy of part of his long-previously published processes, exhibited to them in February 1857. It might have been expected that this statement, going up to the 'Photographic Journal,' would have forced from Mr. Crookes some expression of regret at the injustice he was doing by bringing them out as novelties entirely due to Nièpce de St. Victor,—that he would have been especially anxious to apologize for this, considering the awkwardness of such a mistake, after his having, unsolicited, published and commented on the identical processes as Mr. Burnett's discoveries only a few months before in the 'Liverpool Journal,' of which he was then editor. Well, some notice of Mr. Burnett's claims being thus, by the report of his remarks at the Society's meeting going up to the 'Journal' for insertion, at length forced on Mr. Crookes, he commences his next leader by telling the public, first, that it was not his wish (so it would appear!) to "enter into the question" of identity of the two sets of processes,—thereby shirking his duty to his own character as well as to Mr. Burnett, and deliberately manufacturing a question out of what he had only to refer to the journals indicated (one of which he might also have mentioned was at the time edited by himself) to find to be no subject of question whatever; and then, after occupying half a dozen times the space which would have placed Mr. Burnett's priority in a clear light, by an inflated panegyric of his (Mr. Crookes's) own sayings and doings in general, he winds up with the remarkable announcement that he had himself been carrying on (and hoped soon to bring to perfection) experiments with uranium for nearly a year,—thereby demolishing his only possible excuse for having brought out uranium photography as a novelty entirely due to M. N. de St. Victor, by as good as admitting that he was perfectly aware of Mr. Burnett's priority while publicly ignoring it:—unless he meant us to understand that the experiments which he states he had been carrying on for nearly a year were not suggested by Mr. Burnett's old paper, but that he had by himself* made another and independent discovery of the uranium photography some two or three months after the date when he, as editor, copied Mr. Burnett's paper into, and commented on it as new in, the 'Liverpool Journal,' and that, with a *disinterestedness* of friendship rather uncommon, he had chosen to make a present of the entire credit of the discovery to M. N. de St. Victor; or it might be, that Mr. Crookes, though he had not yet told us so, had made the first discovery long before that date, and had been himself the first discoverer of uranium photography, but had, with an indifference to fame exhibited by few discoverers, goodnaturedly made a present of the credit of the discovery, first to Mr. Burnett and then again to M. de St. Victor,—in which case Mr. Burnett must feel much prouder to be associated as only a co-discoverer with such a "brother philosopher" as Mr. Crookes, than he could do to stand alone as a discoverer, were it even in a much greater or more important discovery than the present one could claim to be, though not altogether unimportant.

Mr. Burnett then proceeded to remark, that since he had last called the attention of the Society to M. N. de St. Victor's rediscoveries, two additional circumstances in connexion with them, to which he would briefly allude, had come before the public. The first was the publication of a patent specification, said* to be (and Mr. Burnett was not aware that the statement as to it had been yet contradicted) on behalf of M. N. de St. Victor for uranium photography, showing (if that were the case) that M. N. de St. Victor, while getting and *not* (as far at least as Mr. Burnett was aware) *disclaiming* credit and honour for his generosity in giving his valuable processes freely to the public, had at the same time been taking steps to prevent their making use of his free gift without paying him first. As to the other circumstance, some of those present had perhaps looked into the last Number of the 'Photographic News.' The innocent simplicity with which M. N. de St. Victor (after the exposure of Mr. Burnett's prior discovery of his former uranium processes, which one would have thought could hardly have escaped his notice) there continues the course of his rediscoveries, by bringing out as a *second batch* of *novelties* most of the remainder of the processes in Mr. Burnett's old paper, as published in the 'Photographic Notes' (for there were many more particulars yet unprinted), which he had hitherto left unrediscovered, was surpassed only by that with which Mr. Crookes, after having had his individual

* Mr. Burnett now finds that Mr. Crookes has actually and in unmistakeable terms (after his two previous publications as the discoveries of others) put forward such an independent claim for himself.—See his 'Photographic News' Almanac for 1859, p. 37, 38.

* By one of the photographic periodicals—'Photographic Notes.'

attention directly called to M. Niépce's *previous* rediscoveries, now brought forward these *farther* rediscoveries from the same paper, as an additional lot of wonderful, and indisputably new, discoveries by M. N. de St. Victor. Members had only to refer to the paper in 'Notes' of March 1857, or to the 'Liverpool Journal' of about the same date, to find not only, at great length, the ferridcyanic development on which Mr. Crookes now expatiated as such a beautiful novelty, but the inverted process, by beginning with the ferridcyanide and finishing with uranium, and the similar cobalt and copper process, on which such an astonishing new theory, as to its being absolutely indifferent at which end of our photographic operation we began, was being built. The discoveries of sensitiveness of the papers prepared with tin and mercury salts would be found in Hunt's 'Researches,' while the astonishing possibility of the producing pictures on paper prepared with sulphate of iron was just as far removed from novelty.

There was still one possible apology for M. St. Victor in this wholesale system of rediscovery. The original discoverers had, by some fortuitous accident stumbling upon the facts, entirely missed the true rationale, and must not therefore grumble that the discoverer of the wonderful "new action of light" should, ignoring their old patronymics, see fit to christen the discoveries anew with his own. Should it turn out that the sensitiveness of the silver salts also, as well as the uranic, was due to this "new action of light," the distinctiveness of which from all hitherto-dreamt-of actions seemed to consist in, 1, that "it is not owing to fluorescence or phosphorescence alone;" and 2, that it is what they might call a "somehow" action—"a power which the bodies" so gifted possess of "*somehow* absorbing light" in a way not to be profanely guessed at the nature of (as in the case of other actions), but received as a profound religious mystery, solemnly, devoutly, thankfully, and unquestioningly, with full faith in it and in M. Niépce de St. Victor,—the public might next expect to hear of a still further discovery of M. de St. Victor, "Paper No. IV., New Action of Light Photography by Absorption; Wonderful new discovery of the sensitiveness of the chloride and other salts of silver."

Should Mr. Burnett, however, have the luck to anticipate M. Niépce in this new discovery (and the case of the silver salts in some respects was much more like simple absorption), he hoped Mr. Crookes, or whoever else had been active in obtaining public honours for Mr. Burnett's predecessor in *re*-discovery, would do all in his power to procure a recognition of its value, and get proper honours bestowed on him (Mr. Burnett); and he would also ask Mr. Crookes, at the same time, to look over a new patent for "*photography by absorption*" *by silver salts*, to see that there was no flaw through which any of those then present could creep, so as to make use of the silver salts, without first paying toll to Mr. Burnett for "Photography by Absorption."

Mr. Burnett then stated that he would watch with some curiosity to see whether, after this *second public exposure*, M. de St. Victor would go on as he had begun, and make the black neutral-tint uranium processes, the cuprotype, and other processes published by Mr. Burnett, the subject of still further *re*-discoveries, and make free gifts, or patented free gifts, to the public of them also*.

Description of a New Actinometer. By THOMAS WOODS, M.D.*

* From the 'Philosophical Magazine' for January 1860. (By permission of the Proprietors.)

PROFESSOR DRAPER of New York published a paper in this Magazine for September 1857, in which he showed that a solution of peroxalate of iron is decomposed by light, protoxalate of iron being formed with evolution of carbonic acid—

$$Fe^2O^3, 3C^2O^3 = 2FeO, C^2O^3 + 2CO^2.$$

In order to find the amount of actinism which had caused the change, the quantity of protoxalate produced, or of the carbonic acid which had been given off, was to be measured: but herein lay the difficulty; it was required to find the amount of gold precipitated from its chloride by the proto-salt in the solution of peroxalate which had been exposed to the light, or to measure by weight or volume the carbonic acid which had been evolved during the same exposure. Now, as Mr. H. C. Draper says in a paper published in the 'Photographic Journal' for last September, "even an enthusiast would soon tire of daily following out these details." Indeed the labour would be too great, even if the results were rigidly exact. The latter gentleman, Mr. H. C. Draper, suggests the weighing of the apparatus in which the peroxalate is exposed, both before and after the exposure, taking the precaution to expel the dissolved carbonic acid by means of a stream

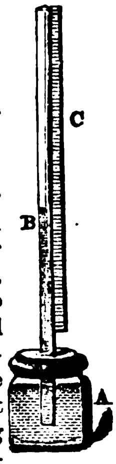
* It was hardly, perhaps, necessary to insert in this Report the reiteration of what has been already and all along expressed (and this refers, of course, to my criticisms on Mr. Crookes as well as on M. N. de St. Victor), that while stating my own opinions, as those to which the circumstances appeared to me necessarily to lead, I have of course neither expectation nor wish that any one should do otherwise than judge for himself.

of hydrogen, and thus to find the amount of fixed air generated by the loss of weight the apparatus sustains. This idea is ingenious; but the process would be very little if at all less troublesome than the others.

An easy and expeditious plan for the measurement of the actinic effect of light is a great desideratum. It would relieve the art of photography of half its failures, and would be of still greater advantage to its science. In order to give a helping hand towards its attainment, I have endeavoured to render the use of the peroxalate of iron as a photometric agent both manageable and simple.

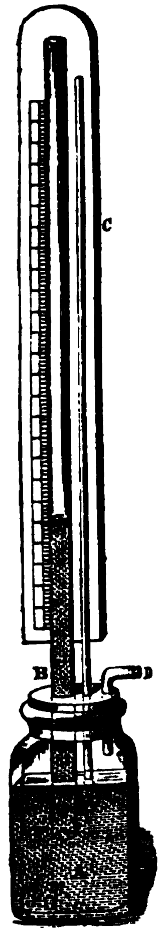
If after exposure any process is required to define the quantity of change effected by the light, especially any process involving knowledge of chemistry or nicety of manipulation, no doubt it will be neglected, except perhaps by the few "enthusiasts," whose results would therefore be of limited value. For this reason I have endeavoured to find a method of measuring the photometric changes at once, and by the eye only, in the following manner:—having nearly filled a phial with a solution of peroxalate of iron, I passed through its cork a glass tube into the bottle, both tube and cork fitting air-tight in their places. This tube, open at both ends, dipped by one of them under the surface of the solution, so that, when the bottle was exposed to light, any carbonic acid evolved should collect over the fluid, pressing it into the tube; and a scale applied to the latter would show at once the amount of action going on. A reference to fig. 1 will explain the construction of the actinometer. A is a low-sized square phial, capable of holding about two ounces. B is the tube passing through the cork into the solution of peroxalate of iron. The carbonic acid collects in the space over the solution, and the fluid is raised correspondingly in the tube, and read off on the scale C.

Fig. 1.



This is the principle of the actinometer; and for taking an occasional observation the above answers pretty well; but there are other circumstances to be taken into account in the construction of a more perfect instrument. For instance, if the temperature varies, the indications are interfered with, and that to an extent the greater the more sensitive the apparatus is. For it is obvious that the sensibility of the actinometer may be carried to any extent by making the tube proportionally small in the bore; but then for the same reason any change of temperature will correspondingly affect the rising of the fluid. Therefore for accurate measurements it will be necessary to have a thermometer dipping into the solution, and a preliminary experiment made in order to find to what extent the change of temperature affects the instrument. It will also be convenient to have a second tube passing through the cork, but not into the fluid, closed of course by a cork or stopcock when the instrument is in use. This tube is for the purpose of allowing the carbonic acid to escape when desirable, or for filling the vessel or emptying it when the solution is exhausted of peroxalate. The apparatus I would therefore recommend, and which I have tried (only, however, for a few days) with apparent success in determining the actinic action of light, may be seen in fig. 2. It shows half the real size of the instrument I used.

Fig. 2.



A is the phial, B the tube dipping under the surface of the solution. C a thermometer, also dipping into the solution, whose graduated scale serves too as a scale for reading off the height to which the fluid ascends in the tube. D is the smaller glass tube passing through the cork, but not into the solution. When the fluid is raised nearly to the top of the tube B by the pressure of the carbonic acid, it may be drawn down again and set to any mark by opening partially the tube D until sufficient fixed air escapes to allow it to descend.

I give in the following page a representation of the heights to which the fluid rose during different parts of two days.

The marks indicate the successive heights of the fluid at the different hours mentioned. The cock D was turned two or three times to allow the fluid to descend, as otherwise it would have overrun the tube.

The thermometer is not registered in these trials, as the temperature did not vary more than one or two degrees. The actinometer was at a closed window; the weather was

ull and rainy, except occasionally, as at 12 o'clock December 7th, and 2 o'clock December 8th. In the sunshine, in the open air, the rise of the fluid was about three times as great as the largest space in the same period of time. The bore of the tube I used was $\frac{1}{8}$th

Height to which fluid rose in tube.	Hour of observing.
	h m
—	8 A.M. Dec. 8.
—	10
—	8
—	7
—	4 50
—	4 15
—	3 45
—	3 35
—	2 45
—	2 35
—	1 30
—	1 25
—	1
—	12 45
—	12 30
—	12 20 Dec. 7.

These figures give the extent of rise of the fluid in the tube on December 7 and December 8. The former commenced at 20 minutes after 12; and the fluid rose to the first mark when half-past 12, to the second mark at 45 minutes after 12, and so on. During the night it rose about one inch. December 8 was a duller day. It is marked each quarter of an hour.

Height to which fluid rose in tube.	Hour of observing.
	h m
—	8 A.M. Dec. 9, when shaken.
—	8 A.M. Dec. 9.
—	7
—	5
—	4 15
—	4
—	3 45
—	3 30
—	3 15
—	3
—	2 45
—	2 30
—	2 15
—	2
—	1 45
—	1 30
—	1 15
—	1
—	12 45
—	12 30
—	12 15
—	12
—	11 45
—	11 30
—	11 15
—	11
—	10 45
—	10 30
—	10 15
—	10
—	9 45
—	9 30
—	9 A.M. Dec. 8.

This actinometer was set, as seen by the lowest mark, at 9 A.M., December 8. The fluid rose in the tube as marked at the several quarters of an hour. During the night the fluid rose from 5 to the first 8 A.M., December 9. On briskly shaking the bottle, more carbonic acid was disengaged, and the fluid rose to the highest mark.

of an inch in diameter, and the solution in the bottle exposed a surface of about three square inches. I mention these particulars, as on them depends the sensibility of the instrument. The larger the surface of fluid exposed, of course the greater will be the action of the light; and the smaller the bore of the tube the greater will be the rise for a given evolution of carbonic acid. I tried a thermometer tube of about $\frac{1}{50}$th of an inch in diameter, and the fluid rose rapidly, perhaps a couple of inches in a minute, but in jerks and irregularly; and I cannot yet say how far the bore may be diminished with utility.

When the fluid is first exposed it shows no evolution of carbonic acid, although the action of the light produces it. The gas is dissolved, to a certain extent, in the fluid, and until the latter is saturated no rise in the tube occurs. The point of saturation is reached after a greater or less time according to the light, generally in about fifteen minutes. This is only a small inconvenience; and I got rid even of this loss of time by having a slight excess of oxalic acid in the fluid, and by adding a couple of grains of carbonate of potash, so that saturation was at once accomplished. But there is a more serious annoyance; the fluid, having been saturated with the carbonic acid, gives it out again even in the dark, so that until it nearly all disappears the fluid continues to rise; the removal, therefore, of the actinometer from the light does not immediately stop the rising. This would not affect the indications if the height of the fluid in the tube was marked immediately before removing it; but there is a danger that the carbonic acid of saturation may be partially escaping into the space above the fluid, even during the continuance of an observation, so that we may have two sources of evolution, one the action of the actinism at the moment, and the other the saturated state of the fluid. For instance, if a strong light fell on the instrument, the gas would be generated quickly; if the light then diminished, the carbonic acid which would then be given out might be due both to the action of the diminished light and to the saturated state of the fluid. I cannot say possitively whether such a double action does take place; it appears probable; but it might be that, as long as the light continues to fall on the solution, the saturated state is kept up, and consequently none comes off, except what is at the moment produced. This point will require some trials to decide. The extent to which the rise occurs is, however, not great, as may be seen by referring to the Table, and might have been due in this case to an accidental circumstance.

If I had time to make experiments with this instrument, I would not publish this account of it, as the doubts I have expressed might be solved, and more certain results might also be obtained by using tubes of various diameters, until the most proper for all purposes could be found: but I have done all I expect to do for an uncertain period; I therefore give the description of the actinometer as it is, and for what it is worth, to the scientific world, believing it to be at least the germ of a useful and interesting instrument. It may be of use to the photographer as a means of exactly measuring the time of exposure of a sensitive plate. The period of time, as reckoned by seconds, will not always give the same amount of actinic force, as the light may vary considerably between two experiments, and yet not affect the eye. If, however, a good picture be obtained during the rise of, say two degrees on the actinometer, the same amount of actinism must always be present during the same rise, be the time of rising longer or shorter. To science also it ought to be a valuable help if its indications are sufficiently reliable.

I should have mentioned that the strength of the solution of peroxalate of iron I employed was 35 grains to the ounce of water; but I believe this strength might be advantageously increased. It will also be necessary, for comparative experiments, to have a cover for the actinometer, in which an aperture is cut of a certain size, say one or two square inches, in order that a known extent of surface may be always acted on. The tube will also require to be covered in delicate experiments, as the light acts on the fluid in it, as well as on that in the bottle.

I must advise those persons who adopt the rough and ready method of manipulating, that in making this appartus, simple as it may appear, there is great caution to be observed in causing the stopper of the bottle to be air-tight, and also the apertures through which the tubes and thermometer pass. When the fluid rises in the tube, a great pressure is sustained by the interior of the phial; and if this be not thoroughly provided against, the air will find some small hole, too minute for observation, by which, very gradually, almost insensibly, to escape; and so the results would be vitiated.

Parsonstown, December 10, 1859.

P.S. Since the above was written I have made some experiments with the actinometer, and it has answered my expectations. I believe it is a reliable register of the amount of action of light. The most important precaution to be taken in its use is to guard against change of temperature, or to have a previous knowledge of the extent to which the change will affect the instrument. Increase of temperature seems to act on it in three different ways. It expands the liquid and confined air, causing the liquid to rise in proportion to the relative bulk of the vessel and tube, as in a thermometer. It expels the carbonic acid from the saturated solution in addition to that produced by the light: the amount of carbonic acid a fluid can dissolve depends on the temperature; the higher the latter, the less gas the fluid can contain; so that if during a lengthened observation the temperature increases, carbonic acid is expelled independent of actinic action. And, thirdly, the higher the stationary temperature is, the greater seems to be the power of the light. In this, as in all chemical processes, heat increases the action. For instance, during a day's exposure, when the thermometer was at 36° F., the fluid of the actinometer rose about 3 inches, whereas in the same period of time, when the thermometer was 60° F., it rose about three times as high. Whether this increase was altogether due to the light acting more energetically on the warmer fluid, or partly to the higher temperature expelling some carbonic acid, I cannot at present decide.

I have used a solution of peroxalate of iron 35 grains to the ounce; and, as it may facilitate matters for others who may wish to try the instrument, I will describe in detail how I obtained the solution.

I dissolved in 6 oz. of water 1043 grs. of protosulphate of iron; I added 180 grs. of sulphuric acid of 1·84 spec. grav., and boiled: while boiling I threw in 140 grs. of nitric acid of 1·42 spec. grav. This caused an effervescence of nitrous acid, for which the operator should be prepared by having the vessel of sufficient capacity and under a flue. The protosalt was thus converted into the persalt. Red prussiate of potash should now produce no blue colour. I then precipitated the peroxide of iron with ammonia and washed with warm water. I had thus 300 grs. of anhydrous peroxide of iron; I diffused this in 20 oz. of water, and added 720 grs. of crystallized oxalic acid—an excess of about 10 grs. of acid. This dissolved the iron and gave me a solution of 712 grs. of the peroxalate—about 35 grs. to the ounce. The bottle of the actinometer holds about 2 ounces, and I used this quantity of fluid without renewing it for some weeks. How long it may retain its power I cannot say.

Parsonstown, Dec. 23, 1859.

Suggestions for a Dry Collodion Process suitable for Large Plates.

To the Editor of the Photographic Journal.

SIR,—It appeared to be the impression of several members at the last meeting of our Society that the object of my paper was to introduce a new mode of working with Dry Collodion, and I therefore take this opportunity of stating that such was not the case. The *theory*, rather than the practice, was what I wished to discuss, since I have not as yet fully satisfied myself as to which is really the most perfect method. In answer to those, however, who would inquire whether my experiments have indicated any one process as simple and superior to others, I would briefly mention the following.

First, prepare the following solutions:—No. 1. Gelatine 2 grains, water 6 drachms, methylated alcohol, 2 drachms; dissolve and filter. No. 2. Common salt 5 grains, water 1 ounce; no filtering needed. No. 3. Best gum arabic 30 grains, gallic acid 1 grain, distilled water 1 ounce; powder the gum finely in a mortar, and rub it up with the water until entirely dissolved. Filter through blotting-paper.

(N.B. This liquid is not well calculated for keeping.)

The collodion which I employ for the process is the horny or parchment kind, iodized with the positive iodizer containing bromide; it gives a film which is rather adherent and does not readily blister. Probably most positive collodions would succeed, particularly those which have been specially prepared for the Fothergill process and are found to answer.

Begin by cleaning several glasses, and applying to the face of each the solution No. 1, made warm by standing the bottle containing it in hot water. It may be poured on like collodion, and the glasses afterwards reared up to drain. If any of the gelatine should touch the back, wipe it away with a cloth, to prevent contamination of the nitrate bath.

Coat the dried plates with the collodion in the usual way, leaving them the full time in the bath (four minutes), in order to obtain the maximum of creaminess. Wash copiously with common pump-water under a tap, or with two changes of water in a dish. Next remove a further portion of the nitrate of silver by means of the salt solution (No. 2), which may be kept in a stock bottle, and poured *quickly* over the film twice (in the same manner as collodion), allowing the excess to flow off into the sink. Afterwards the salt must be removed by a second washing with common water, and the preservative solution (No. 3), of which I use a fresh portion for each plate, may then be applied until uniformly distributed. Dry spontaneously, or by a moderate heat.

The essential feature in this process is the *gum*, which appears to me, at present, to act better than gelatine: the gallic acid is not actually required, nor is the final washing with salt, but both improve the quality of the picture. It is also quite possible to work on glasses not previously coated with gelatine, but in so doing there will be danger of losing some pictures by blisters.

As far as I can judge, this process is equal to Fothergill's in sensitiveness, and much more rapid in development. The image is brought out with the usual pyrogallic acid mixture, such as we employ for wet collodion. All my experiments have been conducted by printing beneath a negative, and therefore I reserve to myself the privilege of making any alteration which may be suggested to me when the season for camera-work arrives. My object in publishing the details of this method at the present time is to submit it to the criticism of those whose experience is valuable; and I think also that, by circulating a matter of this kind in the journals, we usually find, in the course of a few months, whether the process is one likely to be generally successful.

F. HARDWICH.

P.S.—I received not long since a packet of dry plates from Major Russell, prepared by a method which he has described in Mr. Shadbolt's Journal (Process No. III.). The preservative liquid contains metagelatine and gallic acid, and the preliminary coating applied to the plate consists of albumen. These plates answered very well, and had good keeping properties; but the development was rather tardy, and the colour of the image yellow-brown. The substitution of *gum* assists the reduction, and gives what I think to be a better printing colour; but further experience alone will decide whether it possesses equal advantages in other respects.

P.S. No. 2.—I have been very successful in printing transparencies, by omitting both the salt solution and also the gallic acid, the plates being simply washed in abundance of *distilled water* before the gum is applied. These films are very sensitive to half tone, and develope with great rapidity, but they are not to be depended on for long keeping, and are more liable to fog during the development.

Panoramic Photography.

To the Editor of the Photographic Journal.

Jersey, Jan. 7, 1860.

SIR,—According to a promise made in a recent letter of mine which you were kind enough

to publish, I now beg to send for your inspection and criticism an untouched Panoramic Negative upon a curved glass, taken by me on the 7th instant from the hill-side at the back of my house. The lens is a No. 4 Panoramic, 6½ inches focus; and the picture was taken with an equalizing slip of about ⅜ths inch aperture; exposure one minute,—time 3 o'clock in the afternoon,—feeble sunshine.

This negative is the first specimen which I have sent to England, and you will be the first in England to see a specimen and pronounce upon its merits. Unless I am greatly mistaken, you will agree with me that the definition is finer than anything that we have yet seen in photography; and that not over a small angle, or a small space in the centre of the picture (as in ordinary negatives), but over an extent of field exceeding 100° in width and 45° in height. I have seen some hundreds of negatives, many by the first artists, but really and truly none which I think equal to that which I now send you, in all the qualities which photographers admire; and yet it was taken upon a *curved* plate, and with a water-lens.

I shall be greatly obliged to you if you will publish this letter, and add your own remarks at the foot of it. The subject is very important, and I can assure you I find no difficulty whatever in working upon curved glasses, or printing from curved negatives, as the accompanying print sufficiently proves. My only difficulty is in finding that the negatives are too elaborately fine in their details for any process of paper printing. They ought to be copied upon glass by means of a lens.

Please to observe, that although the focus of the lens is 6½ inches, and the picture 13 × 5¾ inches, yet the field is equally lighted, and the definition good both at the top and bottom of the glass.

The Panoramic Lens gives superb definition with a stop sufficiently large for a portrait lens, and I hope to see it used for taking groups of portraits, and also instantaneous pictures including an enormous field of view. I feel nearly sure also that it will do for flat plates and ordinary bits of pictures including 45°, but I have not yet tried it upon a flat plate. As soon as I have, you shall see the result. There will of course be no distortion; and the lens is a "quick-worker," as they say in America, and not slow, like the Triplet.

I shall be very happy to reply to any queries that may be addressed to me on this subject.

Thomas Sutton.

[We have inspected the negative sent us by Mr. Sutton, which is most satisfactory; every part is in perfect focus, even up to the margin. The print is very good; but we believe a better impression might be taken from the negative. It is suspended in the room of the Society, the Members may judge for themselves.—*Ed.*]

Mr. Ackland's Dry Collodion Difficulties.

To the Editor of the Photographic Journal.

9 Holborn Bars, E.C.

Sir,—I have just noticed in Mr. Ackland's paper on "The Difficulties of the Dry Collodion Process," read before the South London Society, the following piece of information:—

"*Blistering.*—This defect seldom occurs in working Fothergill's process, but is often observed in the collodio-albumen, *gelatine*, and oxymel processes," &c.

Now, as one fact is generally admitted to be worth a considerable number of mere assertions, it may be well to state that, having used during the last year or two nearly two thousand of Dr. Norris's dry *gelatine* plates, I have never had one negative *spoilt*, and but two or three *affected* by "blistering." I may further add that, out of the ten difficulties which Mr. Ackland appears to have met with in his dry-plate experience, I have only noticed with the *gelatine* plates "pin holes in the high lights," and this I now prevent by dusting the film before exposure with a camel's-hair brush or piece of cotton wool.

Mr. Ackland's suggestion of varnishing the edge of the film to prevent its peeling off is valuable; had it reached me some years back, I might have been spared much trouble.

A. J. Melhuish.

Practical Observations upon Photographs in their Relation to Art. By Alfred H. Wall.*

Before commencing this paper I pondered carefully upon the character I should (or could) give it: practical I had determined it should be—useful I hoped it would prove—and yet it absolutely needed an introduction, which in itself would constitute a long communication; I must, therefore, solicit your indulgent consideration.

Whenever I take up modern works upon, or connected with, Art, I find that, however much they may disagree in regard to various Art-questions of the day, they are generally harmonious in asserting that photographs are "not works of Art:" to look upon them as such, says the 'National Magazine,' is "a common and ungenerous mistake." Mr. Frank Howard (a gentleman well known as a writer and

* Read at the Meeting of the South London Photographic Society, December 15, 1859.

lecturer upon Art), in the 13th Number of the 'Journal of the Photographic Society,' pooh-poohs the idea of photography rivalling even the humblest branch of Art, and, in a sneering spirit, brings prominently forward, and makes the most of, every defect in its productions. A very eloquent and well-written article in the 'Quarterly Review' (which is frequently quoted) makes much of all its weak points, also; and in the 'Art Journal' for December 1858, a "dialogue held in an artist's studio" appeared, under the title of "Photography for Portraits," which displayed no little feeling against the new art. You may, perhaps, remember that this dialogue takes place between an artist of the ideal school (so much talked of and so little understood) and a certain vulgar, illiterate, and befogged nigger overseer, named, expressively enough, "Dogberry," who, visiting an artist's studio in a great hurry to get his portrait "taken off," naturally stops a tediously long time to smoke a cigar and conduct a long argument with the artist in favour of "photography for portraits." As the artist is a talented, educated, and dreadfully refined individual, and Mr. Dogberry a conceited imbecile, with profound contempt for music, poetry, and painting, but admiring photography and *cheap-coloured lithographs*, the aforesaid argument is, of course, by no means one-sided, and everybody wonders at the glorious victory achieved by the representative of Art over his self-created opponent. I might refer to no end of other similar attacks (emanating in many instances from disappointed fifth-rate painters), but it is no part of my present purpose to refute their objections.

If we desire to know why photography is thus disparaged, the reason is so plainly visible that, putting aside "envy, jealousy, and all uncharitableness," we have but to look around and see it.

In the first place, among the many thousands of photographs passing before us, how many are there which have the slightest claim to any pictorial element? Alas, the number of these is so sadly small, and photographs have, in a general way, so little pretension to anything approximating to Art, that we cannot but regard any want of permanence, which most of them may display, as a charitable arrangement of Providence, brought about by the genii presiding over the beautiful and true. The ease and facility with which a little may be done in photography are its worst foes, and fill our streets with hideous representations of humanity, our folios with drearily uninteresting specimens of snowy or sooty landscapes, and our shop-windows with disgustingly indecent or tawdry theatrical groups, under deceptive titles.

In the next place, as a body, photographers have not set up their standard sufficiently high; great as the superiority of the productions of to-day may be when compared with those of a few years back, in one vital point they are the same—they have no greater claim to artistic qualities. The reason of this may be found, not in photography, but in its students and professors, who take up the art as a mere amusement, a mere mercantile speculation, or as a purely chemical or optical study, without supposing that, as a branch of Art, all the principles of pictorial science are essential to its successful practice. Look at the oldest of our Photographic Societies, the members of which may surely be supposed to have passed the simply rudimental portion of their art: their studies are still confined to manipulatory, &c. details; and of all the papers read and discussed at their meetings, how few of them have a tendency to increase their conception and appreciation of even the elementary studies of pictorial art! Compare the art-student with the photographic: the first, educated to his profession from early youth, giving years of labour for elementary knowledge, and making every various phase of his progress a subject of earnest study; the other, purchasing his apparatus to-day, and in a few months producing pictures, which, being sharp, clean, well exposed and well developed, seem to him the legitimate *end* of all his efforts. Again, take up the various representatives of photographic literature and compare them with those connected with Art. The first are devoted almost entirely to the mechanism of photography, baths, processes, and modifications of processes, trivial improvements in apparatus, tents, lenses, cameras, and sometimes, I regret to add, to bickerings and trivial disputes neither dignified nor estimable. The Art-publication, on the contrary, gives pre-eminence to scientific principles, and enforces rules founded upon the experience of great painters and the inductive reasoning of great thinkers,—the vital importance of which are demonstrated by the productions of the first, the conclusions of the latter, and the instinctive recognition of the uneducated eye.

In making these few remarks I trust I shall not be misunderstood. The mechanism of any art is of great importance, and more particularly is it so in photography; but it should be considered *the means*, and not *the end*. The photographic journals are invaluable as aids to progress, and we all owe them a deep debt of gratitude; but they should aspire to something above the mere mechanical: their great power should be the chief means of raising our beautiful art to its well-deserved niche in the grand domain

of Art. But, for all the errors I here venture to denounce, photographers alone are responsible; *their* works create erroneous impressions on the public mind, and *their* writings fill the pages of our literary representatives. But our art is young, and has, like other young folk, much to learn.

With these few necessary remarks by way of introduction, I will, without ignoring the existence of serious optical and chemical difficulties, now take my ground, in opposition to the Frank Howard and Ronald Campbell school of reasoners, by asserting that light plays much the same part in photography that pencils do in drawing, and that photographs are the production of the camera in exactly the same sense as paintings are the production of paint; that bad photographs, however numerous they may be, are not more legitimate arguments against photography than bad paintings are against painting. Being both artist and photographer, my evidence may perhaps be received with less suspicion than it would provoke if it emanated from the first or the last only.

I propose, then, to throw together a few practical suggestions upon composition, the management of light and shade, &c., in their application to photography.

I do not think that our most ambitious branch of photography, viz. that which takes the same relative position as historical painting does to Art, can ever attain a permanent standing; for in historical painting the grand aim is not to represent things in actual existence as they really are, but rather to select the scattered fragments of expression, or beauty, and blend them into one harmonious whole. I shall presently show some specimens to illustrate this point. The legitimate compartments of photography are to be found in groupings illustrative of various incidents—in landscapes and sea views—in studies from the nude, from cattle, and from objects of various kinds—in portraiture—in representations of still life (such as that true *artist*-photographer, Lake Price, has produced)—and in architecture. Surely here, in every branch of strictly imitative art, there is field enough for our labours, without hopelessly rivalling unconquerable giants so high above our pigmy efforts.

Of course I can now merely make a *very few brief remarks* upon each of these branches—mere indications of things claiming more important treatment, as being quite within the province of photography.

In grouping figures to illustrate various incidents, the chief element of success lies in the choice of clever models; and, most decidedly, for mere physical characteristics, we shall find our best subjects in the studios of artists: but for facial expression they will be found almost useless; for this our best models must be sought among men and women whose minds are imbued by nature, or cultivation, with poetical conceptions, who, feeling deeply, will express correctly the various passions or sentiments required. And here comes the most serious difficulty—poetically organized beings are not frequently found among the class of people who would sit to an artist as a model. Occasionally we meet them: I remember seeing a young gentleman of the shoe-black brigade, who was narrating, to a suspiciously ragged and dirty young urchin, some terrible story; and so full of horror was the one boy's face, and so absorbing was the open-mouthed attention inscribed legibly on the other's, that I stopped, and found that the brigade boy was simply explaining a passage (in his own emphatic, but not very elegant or grammatical language) from some romance of the blood, bogy, and blue-fire school. Now, here was, I doubt not, one who might have been trained into a most excellent model; his features were capable of expressing strongly emotions which he was evidently susceptible of feeling deeply; and these are exactly the qualities needed for a photographer's model. In most of the photographs of this class which I have seen, the models have evidently been chosen for their outside appearance, rather than their capability of expression. Models from the stage are very seldom of use, being of the stage, stagey. I would therefore advise the photographer who takes up this department to cultivate his conception of the picturesque, and look about him for models in the almost unexplored scenes of humble life. In depicting passions, we must be careful that by exaggerated expression we do not, as Hamlet says, "tear a passion to tatters," nor "overstep the modesty of nature." Refinement must never be lost sight of, in every production of art. To succeed in this branch undoubtedly requires the education of an artist. Attention must be particularly directed to the study of expression, in order to select that which is most natural, effective, and true to a purpose; composition imperatively craves study; in groups, crowding must be avoided; ungraceful angles in limbs or accessories shunned; the laws of proportion and symmetry studied. Drawings, paintings, and statuary (especially the antique) should be carefully observed, for a perception of the beautiful; and an eye educated to discover it must be arduously sought. The artist should also remember that expression is not confined to the face, but speaks in every motion of the body and limbs, and that certain forms and faces have in themselves poetical expression apart from muscular motion altogether. Variety must

not be lost sight of, nor contrast neglected; unity of purpose and the relative subserviency of parts must be attained, breadth preserved, &c. But I must quit this subject (which is indeed a vast one, and in itself sufficient for several long papers), and content myself by simply adding that much may be done for the picture in the printing and development, or, when several negatives are used, by varying the exposure in the camera, so as to obtain more definition and relief, by stronger tones of light and shade, in one portion than another, &c. &c.

Landscapes next demand a few practical hints. In this branch, and that of portraiture, photography has progressed most rapidly.

In taking a landscape the choice of light is is of primary importance. If it be immediately before your camera, the objects in the same position must necessarily be in shadow, which may sometimes greatly aid you (if desirable) in procuring a mass of half-tone. Some specimens I have brought (in which the sun has evidently been looking *into the mouth of the lens*) will serve to illustrate this; but others I have will serve to show its more general ill consequences. If the sun be immediately behind your camera, there will, generally, be a want of shadow and force of effect, as in the specimens before you. The position best liked by painters is that in which the light comes from either the right or the left, as we have then strong contrasts of light and dark, unity of half-tints, and powerful relief; but much must, of course, depend upon the character of your view, as even this light, in some exceptional cases, might produce a spotty effect destructive of breadth. [Several fine specimens, by Mr. F. Howard and others, were handed round.] Beyond a doubt the most *brilliant* pictures are obtained near mid-day; for both lights and shadows are then most intense, and the exposure is shorter; but photographs so obtained are seldom (I think) very *artistic*. Nearer morning or evening, when the lengthening shadows blend into masses and the lights are not so strong as to be destructive of harmony (in the gradations of tone), will be the best time for an artist-photographer. As some portions of the view must necessarily receive the most light, it would be as well, perhaps, if you could so contrive that the strongest light should be found upon the foliage.

(To be continued.)

Upon the Use of Stops.

To the Editor of the Photographic Journal.

Hastings, Jan. 6, 1860.

SIR,—The experiments with photographic lenses published in the last Number of your Journal appear to have been tried without regard to the great importance of placing the stops in their correct positions relative to the various lenses experimented upon; and this seems to be a point that most opticians are very wilfully inattentive to, or singularly ignorant about. The idea of testing the "flatness of field" of lenses of different focal lengths and covering unequal fields of view, by placing diaphragms in the same positions for all the lenses, must be erroneous. Such a method can be founded only upon the peculiar "rule of thumb," that tells us to place our stops at a distance from the lens equal to its diameter, whether the stop be ½-inch diameter or sixteen times as large. It is scarcely necessary to say that such a maxim is utterly fallacious, and may practically be proved so with an ordinary camera having a lens with sliding diaphragms, by simply focusing an object in the centre of the ground-glass, and then by twisting the camera so as to focus the same point on the margins of the glass, and doing this repeatedly with the stops at various distances from the lens. It will thus be found that spherical aberration or "curvature of the field" is very much increased by pushing the stop towards the lens; and, with the generality of lenses, the best place for the position of the stop will be at the greatest distance from the lens admitting of equal illumination for the whole field. With a long-focus old view-lens 2¼ inches diameter, I find the best distance for a ½-inch stop to be 2¾ inches from the centre of the lens, and for larger stops, *of course* a proportionably less distance; and to determine this point with diagrams, it is only requisite to ascertain the angle of the field of view embraced by the lens, and the diameter of the lens and of the various stops to be used.

If, however, we consider this angle as a cone, the base of which is the lens itself, the demonstration is much simplified; for the stops may then be regarded as rings to be placed on this cone, and will slip into their relatively correct positions with the base or lens. With "Double combinations," "Triplets," or Orthographic lenses, the argument is somewhat reversed; but in *all* cases it may at least be safely concluded that the best position for any particular stop is necessarily *not the best* for *any other* of different diameter. The utility of stops is not alone to *diminish*, but likewise to *direct* the pencils of light, and more especially the marginal or oblique pencils.

J. R. H.

Archer Testimonial Fund.

To the Editor of the Photographic Journal.

Huntingdon, Dec. 30, 1859.

SIR,—I have read all the plans that have been proposed to aid the Archer Fund, and I beg to call your attention to the following, by means of which I think the fund might be materially aided, and not at any great sacrifice to any one. There are many very talented gentlemen connected with photography who might give very able *popular* lectures on that subject, and who live almost in every part of England; now, if some of them would give lectures in their neighbourhood, charging a small sum for admission, giving the proceeds to augment the Fund, they would soon place it in the position it ought to be, and diffuse general information and instruction as well.

G. R.

CONTRIBUTIONS RECEIVED.

	£	s.	d.
W. B.	2	0	0
Mr. Simmonds, Reading	0	10	6

CORRESPONDENCE.

Levelling the Camera.

To the Editor of the Photographic Journal.

The Vicarage, Tilshead, Jan. 4, 1860.

SIR,—I believe it is generally admitted that in all cases where buildings are to be taken, it is necessary that the camera should be perfectly level. This can of course be accomplished by the use of an instrument made for the purpose; and where expense is not an object, perhaps no other method need be adopted. Will you allow me to inform your readers that the camera may be placed in accurate position by simply placing a boy's polished marble, of either glass or stone, upon the top of it; if not level, the marble will roll off: a trifling movement of one or two of the camera legs will make it stationary in less time than the camera can be levelled by the spirit-level. J. H. JOHNSON.

SIR,—1. You will oblige me by giving your opinion of the newly-invented Solar Camera in the next 'Photographic Journal.' I wish to know if the impressions are good, If a knowledge of the manipulation would be easily acquired, and more particularly as to whether it is likely to supersede the old style of printing for the production of life-size and large photographs. Would an ordinary whole-plate lens be sufficiently large?

2. Can you also inform me why my photographs are so long toning, notwithstanding I use the full quantum of silver and gold? The best authorities say the toning process should be completed in from a quarter to half an hour, whereas I take several hours to produce anything like a good impression, *and that in warm weather*. Is there not a great deal of worthless gold in the market? What rule have photographers for knowing when the toning bath is worn out? W. B.

W. B.—1. We have seen very satisfactory results produced with the solar camera. Its great advantage over the old enlarging process consists in its power of giving a much brighter image on the focusing-screen, thereby enabling the operator to obtain his pictures on ammonio-nitrate paper, which we consider preferable to any development process yet published. The manipulation is very simple. A good whole-plate lens is the proper instrument to use with the solar camera.

2. You would be saved much disappointment by making your own chloride of gold. Put half a sovereign into a bottle, to which add 5 drachms hydrochloric acid, 2 drachms nitric acid, and 6 drachms water; this must now be put in a warm place for a few hours, when the gold will be dissolved: neutralize with carbonate of soda, a green precipitate falls; this is carbonate of copper, which must be allowed to settle; the solution of chloride of gold is now fit for use.

Can you inform an old subscriber, in your next, of the difference between an *under-exposed*, and an *under-developed* positive picture? I have been an operator for many years; but I fancy I have yet this to learn.—RALPH.

Ralph.—In an *under-exposed* plate, the high lights are generally very white, and there is a full deposit of silver on them; the dark parts of the picture very indistinct and scarcely marked. An *under-developed* picture is very different; the entire picture is there, but with little contrast of light and shade; the high lights are more transparent, and it presents, if looked through, much the appearance of an over-exposed negative.

Want of space compels us to postpone a notice of Mr. Melhuish's Metal Camera until our next.

No report of the Blackheath Photographic Society for the past month has been received.

A. Y.—Use whichever chloride you prefer, so far as colour is concerned. It has been supposed by some, that with the chloride of ammonia there is a greater disposition for the proof to fade than with the chloride of barium. Paper prepared with chloride of sodium is also more liable to be affected by a damp locality than with the other chlorides.

A. W. — Many thanks for your communication which shall appear in our next. The pressure on our time has prevented a personal interview.

J. R. H. (Hastings).—The copper will be deposited by the addition of carbonate of soda.

H. N. King (Bath).—The varnish has not been received; we shall be happy to give you an impartial opinion.

Slade Aston.—1. There is no objection to your using the raw umber; we have found a mixture of indian ink and gamboge very useful. 2. There is no need of a second fixing of a negative after it has been made more intense by means of nitrate of silver.

An Enquirer.—Your letter has been mislaid. Write direct to Mr. Skaife, Vanbrugh House, Blackheath; we believe he will supply you with every requisite.

A New Member.—If the gentlemen who have kindly promised to contribute the prints send them to the Secretary, the distribution will at once be made under direction of the Council.

Communications Received.—Sir W. Newton; Rev. H. S. Cerjat; N. H. Edgworth; Mr. Sutton; Mr. Silvy.

Mr. Collie's communication is in type, and shall appear in our next.

Letters of inquiry to the Editor can be answered only through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 94. FEBRUARY 15, 1860.

PHOTOGRAPHIC SOCIETY OF LONDON.

Annual General Meeting.

Tuesday, February 7, 1860.

The Right Hon. the Lord Chief Baron, F.R.S., in the Chair.

The Minutes of the last meeting were read and confirmed.

The Chairman.—Gentlemen, I have to congratulate you upon our assembling at the commencement of another year of our Photographic Institution.

From the paucity of numbers assembled upon the present occasion, I am afraid that the pleasures of last evening* may have occasioned several of the members of our Society to be absent to-night. I do not think that I on any other occasion have addressed so small a number of members as at present.

The first thing that I have to notice is, that I believe this is the last time that we shall assemble in this room upon the occasion of an anniversary. We have given notice that we quit these premises next Midsummer; and I hope the general body of the Society, when they learn that we pay £300 a year for these premises, for accommodation which we formerly obtained for £50 a year, will think that we have acted a very wise and prudent part, when we found that the only benefit that we derived from the change of position was increased expense without any countervailing advantage. The situation turned out not to be *eligible*. I had some difficulty in selecting the precisely proper epithet to give to the locality we now occupy; and it is remarkable that the Photographic Exhibition that took place in these rooms was the only one at which Her Gracious Majesty and the Prince Consort did not honour us by their presence. On every other occasion, at every other place, we had the honour of receiving Her Majesty and His Royal Highness; but here we had not that honour; and there must be some reason for no use being made of the rooms which we thought might be of advantage to the general members of the Society. In point of fact it turned out that we derived no benefit whatever from this increased expense.

I have to announce that the expenditure of the Society has not exceeded its income; and in these days of increased expenditure I think that is, to say the least of it, very gratifying. We have not gone beyond the available sources we clearly possess.

I am sorry that I cannot report any large increase of members. We certainly have had no decrease*. I think the better way of putting it, gentlemen, is this—that there has been no decrease of the Society. We are as flourishing as when we here began; and I suppose that it is hardly likely that there will be precisely the same number who have quitted us as those who have joined us. I dare say we have one or two more than in the beginning of the year.

In speaking of the loss the Society has sustained in the number of members, I have occasion to mention that we have lost the presence and encouragement of Lord Londesborough, who devoted a very large portion of his income liberally to the support of Art and Science in various directions, and who was a very warm friend of the Photographic Society; and I regret to say that we have also lost the elder Mr. Ross, whose firm is so well known to every gentleman connected with astronomy by their remarkable production of lenses for all purposes, either astronomical, photographic, or microscopical.

* The soirée of the Society, which was attended by nearly 900 visitors.

* The Secretary, in an audible whisper, informed the Chairman that upwards of forty members had joined the Society during the past year.

There was a very disagreeable—I believe the proper mode of speaking of it would be, a sort of sore place, which arose out of the supposed occupation of the name of the Journal of the Photographic Society by some other publication. We instituted proceedings in Chancery; and all those who know anything about law, and particularly that branch of the law which is called Chancery, know that it is better not to go in; but if you are in, the best thing is to get out again. I do not speak of these matters disparagingly. I assure you that it would be more gratifying to me if I could speak of the law as a study of the greatest delight, and the practice of the greatest comfort; and I believe it is so to those who occupy a *certain position*; but when one becomes, either as President of the Photographic Society, or in any other capacity, a litigant party, you take a different view of the subject, you see it in what is called *another* light; and I am sorry to say we incurred some expenses, and derived very little profit. We can console ourselves by the application of the observations of Dean Swift in his 'Voyage to Laputu,' with respect to the mistakes that the tailors made who measured people by quadrants and other mathematical instruments instead of by the common measure of tape and parchment—that everybody was satisfied to find his neighbours in the same position as himself. We have a large number of our neighbours in common with ourselves who had the expense and disappointment in the loss; and it is very gratifying to find that at length it has received what is called an amicable termination; and, what is more gratifying, we do not find that, upon the whole, the Photographic Journal is less called for, is less read, and, what is very important, is less contributed to; and, upon the whole, we have not lost anything by the apparent contest in which we were engaged in that respect. The Photographic Journal is as much read, and is as productive of advantage to the Society, and I hope to the public, as it ever was.

There was a matter which I mentioned a year or two ago to the Society: I mean the discoveries of a foreigner of the name of Nièpce, who was capable, apparently, of bottling light. It was a subject which in the first instance promised to be of the most interesting kind; and I own, when first it was announced, it appeared to me to be the first step towards very brilliant discoveries with reference to the action of light, and to an investigation of what is the medium, if it be a medium, or, if we are to go back (and I believe it is going back) to the theory of projection of light, what is the course of division. One of our most distinguished Members is very doubtful of the fact announced in this communication; and I am very much in the habit of giving large credence to the opinion of that gentleman in matters of philosophy and in his own sphere—I mean Mr. Hardwich; but undoubtedly there are some who are members of the Society (and I believe there are more who are not) who consider that the experiments have been so far repeated that they may be considered as successful. It appears to me that it is very desirable that we should ascertain, as far as we can, in our own private laboratories—if I may so say, by our own experience we should ascertain what is the fact concerning these very curious experiments, which really amount to the bottling up of light (that is really what it comes to). You can get, apparently, into a dark place some action, something which shall continue, not permanent, but for a certain time after the rays of the sun have exercised their influence; you can obtain something which shall operate upon paper properly prepared so as to receive the image of a print or drawing or anything that has been made for the purpose of communicating its influence to prepared paper. I do not know anything that originally promised to throw more light upon the theory, structure, or whatever it is that causes the division, of these experiments. I have the highest respect for the very distinguished member of our Society alluded to; but I cannot help wishing with all my heart that he may turn out to be wrong, and that we shall be able in some way to come to a conclusion upon the subject of light; for I am really very impatient for the Photographic Society to do something more than merely contributing to Art—to be ancillary to Science, and from day to day more and more astonish the world.

Gentlemen, I am very happy to say that I believe the Society is safely progressing from year to year: its communications are received, I believe, by the scientific and practical world more and more from year to year with greater confidence. We are apparently flourishing; we are contributing in a very eminent degree to the records of those matters which are of a fleeting character, and which, if they were not recorded by photographers, would perish for ever.

I think I ought to mention that this year we adopted the plan of exhibiting in Pall Mall, and, I believe, with very great success. The rooms in which we have met on this occasion and some others certainly turned out not to be at all adapted to such purposes: the upper part of Suffolk Street involved a walk of a few yards out of the way, which, oddly enough, seemed to prevent the public going to that end of a street having no outlet; and this year we went into Pall Mall East, with very great

advantage. H.R.H. the Prince Consort came there this year, and expressed himself highly gratified. We seem to be steadily progressing; and I have no doubt that, with your united efforts to do whatever can be done to advance this highly scientific art of Photography, prosperity will attend the efforts of every member of the Society to render the Photographic Art that which it ought to be—one of the signal blessings to mankind of the present day.

The following gentlemen were duly elected Members of the Society:—

Charles Ruland, Esq.
Warren De la Rue, Esq., F.R.S.
H. Claudet, Esq.
Francis Bennoch, Esq., F.S.A.
H. C. Heath, Esq.
Edward Evan Notten Pole, Esq.
F. Scrivener, Esq.
William Telfer, Esq.

The Secretary then read the Report, which was duly received.

A Member asked how it was that there had arisen a necessity for selling out £200 when the income had exceeded the expenditure.

Mr. Crace explained that there were outlying expenses making it necessary to sell to that amount.

Mr. Kilburn was afraid he was not in order; but as his Lordship had mentioned the Exhibition, he was anxious to ask a question which had resulted from a case arising out of the present Exhibition. He stated that there were three pictures exhibited under the name of Mr. H. Hering, and purporting to be the productions of that gentleman, which were coloured by Mr. Kilburn's own artists, yearly engaged at fixed salaries. As he apprehended that all pictures at the Exhibition were to show the proficiency of the exhibitors, he could not conceive that pictures which were taken at the exhibitor's establishment and coloured by the artists of another establishment could represent that. The fact, unfortunately, was too prevalent. With some of the low members of the art, it was the practice to exhibit works at their doors, perhaps imported from France, but certainly not their own productions. He had hoped the Committee would withdraw the pictures, inasmuch as, supposing the public should patronize the establishment of the exhibitor, he could give no guarantee of such an amount of excellence, as the artists were under yearly engagements to him, Mr. Kilburn. Perhaps giving publicity to the fact would meet the exigences of the case.

The Chairman did not think the meeting could do more than receive a notice of motion.

Mr. Crace thought the obnoxious exhibitor should have notice too.

Mr. Kilburn said he had called upon Mr. Hering, and given him notice that he should bring it before the first meeting of the Society.

Mr. Crace stated that the Society made it a condition that all coloured photographs should be accompanied with a pure untouched one; and that was what was to be looked at for excellence: all artistic skill brought to bear upon it afterwards was extraneous from the pure merit of the photographic; and although unfairness takes place, of course it was to be condemned; but it was a question between the two exhibitors, and not a fit question to absorb the time of a meeting.

Mr. Kilburn stated that the person alluded to had exhibited coloured pictures with accompanying untouched photographs; but in every case this rule had not been enforced.

The Chairman asked whether any gentleman would propose scrutineers? if not, he would recommend Messrs. Shadbolt and Kilburn.

Mr. Shadbolt suggested a vote of thanks to Mr. Rosling, the late Treasurer, which was duly moved, put, and carried.

The Chairman (holding the audited accounts in his hand) said: The Secretary has proposed to me to read these accounts. I told him what I have very often said in my own court, that there is nothing so uninteresting and uninstructing as a series of figures. I do not know that, if you had time to look at them and to ponder over them, and to compare them with the accounts of last year, and to think about them, any one would be the wiser if Dr. Diamond were to read over the whole of these pages. If any gentleman be desirous of having the figures read, they shall be.

Members stated they had sufficient confidence in the Auditors.

The Chairman.—In the first place, I believe one may, without fear of any contradiction, say that there is nothing so disagreeable as a figure; and although there may be something to the debit, there may be an opposite account to the credit: still, it is not remarkably pleasant to be meddling with arithmetic where you do not derive any pecuniary advantage; nevertheless, if any gentleman wish it, I am sure I shall be happy to communicate anything of the general expenses, or of the exhibition account, or the soirée account (that is a very recent affair, if you wish to hear anything of it), and the property account. You had better move, Dr. Diamond, that it shall lie on the table.

The Secretary laid the accounts upon the table.

A Member asked whether an abstract of the accounts would be published in the 'Photo-

graphic Journal,' as it appeared to him to be desirable that the members should have some slight idea of the finances of the Society.

The SECRETARY said the accounts would appear in this Number.

The CHAIRMAN stated that the Collodion Committee had made a Report, which was upon the table and would appear in this Number; but if it were the wish of the Meeting that it should be read, the Secretary would have great pleasure in reading it.

Mr. HEATH.—My Lord, I may venture to make a remark upon that Report. I, of all persons, do not desire it to be read now. I think it would occupy too much valuable time: but I cannot help thinking, nevertheless, that as this evening is devoted to the annual business of the Society, yet we have engrafted upon it probably one of the most important papers that ever came before the Society. Now, whether I shall have the good fortune to carry the Meeting with me, I do not know; but I cannot help thinking that a paper of that consequence and importance should have an evening to itself. I do not speak of it in any hostile spirit; but when we think of the importance of collodion itself, I think that any paper that comes before this Meeting as a Report of a Committee upon that important element should receive more attention than it can at this Meeting. I will go further, and say that we shall be most jealously and most carefully watched by all societies and photographers throughout England and all Europe; and before we put our seal, either of approval or not, upon that Report, I think we should have plenty of time for consideration and discussion; and I would, with the consent of the Meeting, move that that Report shall not be read to-night or published in the Journal, but stand for discussion and consideration at the next Meeting. If any gentleman will favour me by seconding that motion, I shall be glad.

The CHAIRMAN.—Will you allow me to suggest that, if it be the object to discuss the Report at some future Meeting, it will be very desirable, either that the Report should be placed in the hands of EVERY MEMBER separately, or that it should appear in the 'Photographic Journal' as quickly as possible?

Mr. HEATH.—I beg pardon for intruding myself again. My objection would be, that if that Report were published in the Journal of the Society, it enters at once upon the transactions of the Society, and takes its place just as much as if it had been received and passed as the act of the Society.

Mr. CRACE stated that it would be the act of the gentlemen whose names appeared to it.

Mr. HEATH.—I shall be quite content that it shall appear in the Journal, with the discussion that will take place upon it.

Mr. KILBURN moved, as an amendment, that it should be published in the Journal, as it would be more likely to raise discussion.

Mr. TURNER suggested the insertion of some preliminary remarks, showing that the Report was not yet adopted by the Society.

Mr. CRACE.—I second that amendment, because I think it the simplest way, and a saving of expense.

Mr. HEATH.—The Journal goes into the hands of gentlemen who are interested in photography, and who are not members of the Society; whereas it would be perfectly simple, if it were intended to raise discussion upon the matter, to supply every Member of this Society with a copy of that Report before the next meeting.

Mr. SHADBOLT.—I think perhaps Mr. Heath is under a misapprehension as to the Report. At the last Meeting it was announced that the Report would be issued; and consequently it will be somewhat stultifying the Society if that is not issued; and there has always been standing on the paper of the Society a notice that the Society could not bind itself to the opinions either of the contributors or even of the editors; consequently there cannot be any mistake as to the Report put forward by gentlemen whose names are appended to it.

The CHAIRMAN.—Perhaps it would save any further discussion if the motion were carried unanimously thus, that the Report should be published in the Journal of the Society merely as a Report, with an intimation that it would be taken into consideration at the following Meeting; and, as remarked by a Member, that will consist more with economy, because publishing it separately is not without some expense.

A motion as suggested by the Chairman was carried unanimously.

The annual balloting of Officers having taken place,

The CHAIRMAN said: The Scrutineers report that the five Members of the present Council recommended to retire are, the Rev. J. Barlow, F.R.S.; P. W. Fry, Esq.; J. D. Harding, Esq.; M. J. Rippingham, Esq., and Alfred Rosling, Esq.; and that the Members recommended to be elected into their places are—Professor Delamotte; J. Durham, Esq., F.S.A.; Dr. Arthur Farre, F.R.S.; J. D. Llewelyn, Esq., F.R.S.; and Professor Wheatstone, F.R.S. The Officers for the ensuing year are reported by the Scrutineers to be—as President the present President, who has the honour to address you, and to thank you for the honour of his election; the Vice-President is C. B.

Vignoles, Esq., F.R.S.; and the Treasurer is A. R. Hamilton, Esq.

The thanks of the Meeting were awarded to the President.

The Council of the Photographic Society take leave to submit to the present Meeting their Seventh Annual Report.

In making this Report they have officially to announce that, in accordance with a general desire on the part of the Members, they have determined to relinquish the apartments at present occupied by the Society. The first term of the lease will expire at Midsummer next, and notice has been given to the Managers of the Unity Bank that the Society will then terminate their tenancy, according to the provisions of the lease. The Council feel satisfied that in so doing they are consulting the best interests of all, being fully convinced, from their own experience and from the suggestions of other Members, that for the annual outlay which is incurred no adequate return is received.

When the premises now in occupation of the Society were taken, it was thought that the present meeting-room would afford a good locality for the Annual Exhibition of the Society, but the test of experience has negatived that supposition: not only have the rooms been found too small, and altogether inadequate to the requirements of exhibitors, but the site has also been found to be objectionable.

After the Council had become convinced of the inconvenience of the house for the purposes of an exhibition, they did their utmost to make he rooms agreeable and useful to the Members, t other times than those for which they have ought the patronage of the public; thinking hereby that possibly a considerable number of ew Members might be induced to join the ociety from the advantages held out. They herefore instructed the Secretary to take steps or rendering the rooms more generally useful, nd considerable personal exertion was made to ttract the Members to the reading-room. In he 71st Number of the 'Photographic Journal' n appeal was made to the amateurs and prossors of photography in the following words:

"The Council of the Photographic Society lesire to draw the attention of Members of the ociety to the fact that their rooms in New oventry Street are at their service for all purposes connected with the progress and recogition of the heliographic art, and of diurnal ommunication among its disciples. These ooms are in the centre of London; they are isited, or *may* be visited, by all students of hotography; they are supplied with the leadg public journals of letters, science, and art, and are rich in the current accounts of photographic discovery and adaptation.

"A photographic library is also in progress of formation, and is becoming more and more important. These apartments are open every day in the week to Members of the Society. On the walls will generally be found the works of those earnest followers of the art who desire to consult their brethren on points interesting to all. The Council desire to place these rooms still more completely at the disposition of the Members, so as to promote a yet more fruitful and effective intercourse among them; they will therefore be particularly pleased to offer every facility to those gentlemen who may wish to exhibit works showing new discoveries in the art, or new modes of application in the resources already known."

No sufficient response was made to this appeal to warrant the Council in believing that the attempt had been successful in the degree that they had hoped, and which would have justified them in retaining the rooms for these useful but still secondary purposes. It seems doubtful whether, upon an average, a single person per week has frequented these apartments. Non-use of the reading-room of a literary society is not the case with photographers alone; it appears that the libraries and reading-rooms of some of our oldest, most useful, and venerated societies, enjoying a far larger number of active members than our own Institution, are scarcely ever visited except at the time of the ordinary meetings of the Members.

The expense of the house, exceeding 300*l.* per annum, has been a heavy demand upon the funds of the Society; and, as the annual subscription of its Members is only one guinea per annum, these rooms have entailed a considerable loss, and the consequence is, that the balance-sheet this evening exhibits a less favourable aspect than would otherwise have been the case.

In order to clear off payments which should have been made in former years, there has been a necessity to sell 200*l.* worth of the Stock invested in the Bank in the names of the trustees. At the same time, however, the Council desire to point out to the Members that the current expenses of the Society do not exceed its income.

The members of the present Council, aided by those gentlemen elected at this meeting, will use their best exertions to secure a locality for the Society at least as agreeable and less expensive than the present one. Any suggestions addressed to them from individual members will be thankfully received and considered in the interests of the Society.

The differences which existed at the commencement of the present year, as to the title of the Society's Journal, have been satisfactorily and amicably arranged; and it is gratifying to state that the Journal continues to be highly remunerative.

During the year there has been a large increase of new Members, upwards of forty having been elected; thus proving beyond dispute the interest which the photographic art still excites among artists and men of science.

It was announced at the last annual meeting that each Member might expect to receive a copy of some photographic work approved by the Council. After that announcement was made, several gentlemen kindly offered to contribute fifty prints each, of their own production. Some of these specimens of Art-productions have been received, and it is intended that a distribution shall take place at an early meeting of the Society during the present year.

There has been no great or startling discovery to chronicle during the past year; yet a steady progress has been made in the practice of the heliographic art. It may be safely affirmed that the walls of the Exhibition now open show a greater number of truly good pictures than has ever appeared at one time on any former occasion.

The chemical examination and practical use of collodion have occupied the attention of a Committee of Members of the Society, and it is believed that the Report which is presented this evening will enable photographers to pursue their operations with greater confidence than they have hitherto done.

The sanguine hopes which were entertained of the successful application of carbon as a permanent printing process seem in a fair way to be realized, as will be proved by the issue, with the next Number of the Journal, of a print given by Mr. Joubert, which promises perfect durability with great facility of reproduction.

The officers of your Society who vacate their functions this evening leave their acts to your consideration, and offer themselves, in accordance with the law, for re-election. The Council have only to add that during the year they regret to have lost the valuable services of your late Treasurer, Mr. Rosling, whose removal to Reigate has rendered constant attendance at the meetings of the Council inconvenient. His place has been temporarily but most ably filled by Mr. Hamilton, who has on many occasions rendered good service to the Photographic Society as auditor of the accounts, and who now places his commission in your hands for renewal.

PHOTOGRAPHIC SOCIETY.

Income and Expenditure Account.

Dr.

Dec. 31, 1859.	£	s.	d.
To Entrance Fees and Subscriptions	396	7	6
Photographic Journal	83	6	6
Interest Account	18	4	10
	497	18	10
Capital Account for Balance	88	17	9
Being an excess of Expenditure over Income	£586	16	7

Cr.

Dec. 31, 1859.	£	s.	d.
By General Expenses	528	4	[illegible]
Exhibition Account	6	18	[illegible]
Soirée Account	27	3	[illegible]
Property Account, 10 per cent.	24	10	[illegible]
	£586	16	7

General Balance, Dec. 31, 1859.

Dr.

Dec. 31, 1859.	£	s.	d.
To sundry persons	131	13	4
For Balances owing to them.			
To Capital Account	1173	6	11
For Balance.			
	£1305	0	3

Cr.

Dec. 31, 1859.	£	s.	d.	£	s.	d.
By sundry persons				342	14	4
For Balances owing by them.						
For Subscriptions in arrear—say				100	0	[illegible]
By Cash Account:—						
For Balance at Bank	£143	8	9			
Petty Cash in hand	0	14	11			
				144	3	[illegible]
By Three per Cent. Consols. For £200 Stock.	192	14	4			
By Property Account. For Estimated Value.	220	10	0			
By Photographic Journal. For Value of Stock.	304	17	11			
				718	2	3
				£1305	0	3

We have examined the above Accounts, compared them with the Vouchers, and find them to be correct.

February 3, 1860.

J. R. MAJOR,
VERNON HEATH, } Auditors.

Report of the Collodion Committee.

In March 1859, the Photographic Society appointed a Committee to examine samples of photographic collodion, and report upon them, with a view of arriving at a definite formula. Advertisements were issued, which were replied to by Messrs. Hardwich, Mayall, and Sutton; but the two latter of these gentlemen did not send in collodion in sufficient quantity to admit of its being thoroughly tested. Hence, although individual members have worked with the collodions of Mr. Mayall and Mr. Sutton, the Committee in its collective capacity can only pronounce upon that prepared for them by Mr. Hardwich. They trust, however, that the investigation which they have undertaken will not be suffered to end with one Report, but that other makers of collodion will come forward and assist the Society in the determination of this difficult but important question.

In proposing to themselves a scheme for the general conduct of their operations, your Committee did not think it advisable to place too much reliance upon experiments made in concert, since these must necessarily have been few and imperfect. It appeared to them better to allow the members to work separately, and afterwards to collect and compare their individual reports. Nearly a year has now elapsed since the Committee was formed, and it cannot therefore be objected that its conclusions have been hastily drawn; neither can it be said that the Report has been made without a full and impartial examination, for the names of no less than twelve members are appended, who are known to the Society to practise every branch of the art. Portraiture, both in the studio and in the open air, landscape scenery, architecture, copying, and sculpture, have all been represented in this investigation; and the lenses employed, and plates covered, have been of every conceivable size. Further, as the various members of the Committee differ in their views of the best modes of iodizing photographic collodion, opportunity has been afforded of comparing the results obtained by each method and of drawing conclusions therefrom.

This Report, professing to deal with the practical working of negative collodion, may be naturally divided into two parts; for the experience of members of the Committee using simple iodides does not admit of comparison with that of others employing in preference iodide and bromide conjoined. There is, however, one ground common to both, viz. the *mechanical properties* of the collodion under examination; and of these we proceed to speak.

The Committee are unanimous in thinking that the collodion which Mr. Hardwich has sent in to them is comparatively, if not entirely, free from glutinosity, crapy lines, contractility, and other defects of the film, which were very commonly met with some years back, when the manufacture of collodion was first commenced. The reports of Messrs. Delamotte and Fenton are the most valuable on this head, since they have worked on glasses of a large size, viz. 24 inches by 18, and 18 by 15. Their experience is, that although the collodion sometimes contains too much soluble cotton for these large plates, and occasionally requires thinning down with ether and alcohol in very hot weather, yet that the pyroxyline is nearly of the right kind as regards flowing properties, and may with justice be said to be well calculated to support a smooth and even layer of iodide, without any woolliness or ridges.

Another matter which falls under this same head of mechanical properties is the tenacity of the film, and its adhesion to the glass. We are satisfied that the collodion submitted to us is sufficiently tough to bear a reasonable application of water, either from a tap or a jug, without tearing, and that with ordinary care in manipulating it will not fall away from the glass. No member of the Committee, as far as can be gathered from their separate reports, has been compelled to grind the surface of the glass at the edge to prevent splitting, or curling off on drying. Mr. Fenton, indeed, states that on using some of the earlier samples of collodion supplied to him by Mr. Hardwich, he was obliged to roughen his largest plates, but that with the collodion which he received during the past summer and autumn he did not find it necessary to take this precaution.

The Report being satisfactory on the points above mentioned, we next consider the quality of the film yielded by the collodion, as regards closeness or openness of texture, and here it is found that some members speak of it as being too horny. That the film does possess such a structure is certain, and hence the question of how far this must be considered a defect. The following are extracts from the reports of those members who make complaint. Mr. Bedford says, "One fault I have found is a too quick drying of the film in hot weather. If, as is frequently the case, the plate has to be kept over fifteen minutes or so, it is necessary to add alcohol to the developer to prevent stains and patches of unequal development." Mr. Hughes also observes: "My dark room being small, and with a southern exposure, becomes almost like an oven in hot weather, and one of the principal difficulties which I encountered was the partial drying of the film whilst it was in the camera slide." The attention of the other members of the Committee was particularly directed towards this horny

quality of the film; but, with the exception of Mr. Morgan, who speaks of it as inconvenient, but not insuperable, they make no allusion to it in their replies.

Passing next to the consideration of the photographic properties of the collodion, we find it necessary, as before said, to distinguish between the results obtained by simple iodides and those from iodide and bromide in mixture. To begin with the former, there are embodied in this Report the observations of nine or ten members who have worked either with iodide of potassium, as an iodizer, or with iodide of cadmium. The following is an epitome of their conclusions:—

First, with regard to the sensitiveness of the collodion, the opinion of the majority is, that it is unsurpassed. Mr. Delamotte, who has worked in the subdued light of the Crystal Palace at Sydenham with lenses of very considerable focal length, speaks confidently on this point; and Messrs. Bedford, Hughes, Robinson, Sedgfield, and Williams are of the same opinion. Mr. Frith also, in a letter dated Cairo, August 1st, 1859, says: "I find this collodion exceedingly rapid. Three days after iodizing (potassium iodizing solution), it will take a picture with the smallest aperture of the landscape lens (15-inch focus) in five seconds; and I have some hope of getting an interesting series of instantaneous pictures, by using a stop of 1½-inch diameter on the portrait-lens (3¼-inch diameter). The lens then covers a 4½-inch plate, with tolerable depth of focus; and I can obtain a sufficiently developed picture with an absolutely instantaneous exposure, sailing boats with the ropes sharp, moving figures, &c." Under date of the 7th of August, he adds: "We have just returned, after having spent five days in the mud house of an artist at the Pyramids, where we were devoured by thousands of sand-flies; the water very bad, and the heat great. I worked hard, and took some fine pictures. Nothing can be more satisfactory than the performance of the collodion. I still get landscapes with the smallest aperture of the view-lens in four seconds, and have taken capital pictures in the heat of the day. I should imagine the temperature in my little tent could not be less than 130° F.; the developing solution was quite hot*."

Mr. J. Morgan of Bristol, in the report which he has forwarded, does not coincide with the above statement, for he says: "I am able to obtain a similar negative with another collodion in one-half of the time." This discrepancy is the more remarkable because the nitrate bath in each case was made out of pure nitrate of silver crystallized purposely for the Committee. The developer, however, which Mr. Morgan employs contains less than the usual proportion of pyrogallic acid, and he sometimes, but not invariably, adds a small portion of citric acid.

When iodide of potassium is employed as the iodizer, the collodion loses its sensitiveness very considerably after a time; but the members of the Committee are not agreed as to how long it will keep in good working condition. Mr. Bedford says: "I prefer using it newly iodized, say in about two days; after five or six days it loses sensitiveness, and deteriorates rapidly, but in this state it works well enough when time of exposure is no object. I kept it in even working order by adding some freshly iodized collodion to the stock-bottle daily." Mr. Delamotte writes: "I found, whilst working in the Crystal Palace, that it lost a good deal of its sensitiveness in three or four days; and in offering a suggestion for the improvement of this collodion I would say that, if possible, it be made to retain its sensitiveness longer, with the same qualities it now possesses in other respects." Mr. Morgan says, in reference to its keeping qualities: "A day or two after iodizing is the best time. I have taken a landscape picture with it after a month, but I do not think it improves by keeping as long as that." Mr. Robinson reports: "It gives good results for portraits if used immediately after iodizing, but I prefer it when it has been kept two or three days, or for landscapes two or three weeks." Mr. Sedgfield, giving his experience in stereoscopic photography, writes: "I cannot say much as to its keeping qualities, as I seldom have any by me more than a week old." Lastly, we have the report of Mr. T. R. Williams, who, working in a London studio, necessarily requires the maximum of sensitiveness. He considers that the collodion does not alter much during three or four days, but that afterwards it becomes useless for the purpose which he requires.—The foregoing observations apply to the summer season of the year, and not to the colder months, during which the deterioration in sensitiveness is less rapid: Mr. Williams has lately obtained good pictures after a fortnight's keeping.

We next examine the collodion with regard to the quality of the negative which it yields, and in this respect we are able to pronounce upon it favourably. The image is very sharply defined, and the development can be pushed to an extent sufficient to bring out the deepest shadows without adding too much to the opa-

* It is only fair to state that the above favourable opinion from Mr. Frith was extracted from private letters written without any idea that they would be included in this Report.

city of the high lights. The printing qualities of the negative are good, and those parts of the film which are protected from light remain free from fogging. The liability to staining and marks of all kinds in hot weather is not great, as attested by Messrs. Delamotte, Morgan, and others, who state that the collodion gives a clean and bright picture.

In drawing up a Report in which gradation of tone in a photograph is spoken of, it must always be borne in mind that the character of the light and the aperture of the lens have much to do with the hardness or softness of the picture; and this observation we find corroborated in the separate reports sent in to us; for whilst one or two members have found at times a difficulty in obtaining sufficient contrast, others have complained of excess of intensity, although both were working with the same description of bath. Mr. Bedford alludes to this, and says: "In a strong light or glare of sunshine, there is, I think, a tendency to too great density, a too rapid starting out of the image. This I have remedied by employing a weaker developer, and in some cases, by washing the free nitrate away from the plate before putting it on, or washing the plate once or twice during the development, using, in that case, silver to give force to the image. By this means I avoided hardness, and secured a good picture under trying circumstances of light and heat." Allowing for these differences in intensity, which must occur with any collodion, we find that the preparation which we have examined is sufficiently good, and that it is not a collodion of that kind which requires a considerable addition of nitrate of silver to the developer, or fails to yield an intense picture unless acetate be added to the bath. As a rule, the image will attain its maximum density shortly after the pyrogallic acid is applied, and there will be a fair share of the characteristic drab or cream colour upon its surface.

Whilst speaking of gradation of tone, it may also be remarked that different developers have been employed by the Committee to assist in securing the correct amount of contrast under varying conditions of light and temperature. Thus Mr. Delamotte, working in the Crystal Palace, at rather a low temperature, has developed plates of the stereoscopic size by preference with sulphate of iron, and Messrs. Robinson and T. R. Williams have occasionally used the same reducing agent for portraits. The intensity of the negative taken with sulphate of iron is often sufficient; but if not so, the development is completed with pyrogallic acid and nitrate of silver.

One question put to the individual members of the Committee was the following: "Have you found the collodion to injure the bath by long use?" The reply is in the negative; and this we consider of importance, because we have on other occasions worked with collodions which had a decided effect in throwing the bath out of order. The Committee, as a body, pronounces no opinion on the cause of this; but certain individual members attribute it to the employment of methylated spirits, in place of the pure ether and alcohol which are used by Mr. Hardwich.

The seventh question in the suggestions on the order to be observed in drawing up the reports was as follows: "What do you consider the principal defects in the collodion?" Mr. Hughes complains of transparent spots with tails, taking the direction of the draining, and showing most distinctly when the collodion was newly iodized; but by using bromo-iodide instead of simple iodide, and developing with sulphate of iron, the spots almost invariably disappeared. Two or three of the members speak of narrow black lines like threads in the direction of the dip,—these same lines being sometimes, but not invariably, remedied by rocking the plate laterally immediately after putting it into the bath.

Under the head of Question 9, viz. "State anything which has occurred to you in the course of your experiments likely to forward this investigation," we have the following suggestions from Mr. Russell Sedgfield: "A collodion iodized with *cadmium* only is very useful in extreme cases, such as dark glens, &c., and I always carry a little with me on my excursions. At present my decision is in favour of a pure potassium iodizer, with some cadmium collodion carried separately for use on occasion, either by itself or, perhaps preferably, mixed. The mixture of the two seems the best for the majority of amateurs, who cannot be expected to go into detail in these matters, and whose consumption is small and irregular. When iodized, it certainly keeps much better than it would with potassium alone; and I have just been taking, to satisfy myself, some excellent portraits and views with remnants from my last journey, iodized three months ago."—This plan of mixing together collodions possessing opposite properties has been successfully adopted by several members of the Committee, when they have satisfied themselves as to the working qualities of each collodion by using them apart.

Mr. T. R. Williams was supplied with cadmium collodion from the Committee, in addition to the same plain collodion iodized with potassium; he remarks upon it as follows: "I have found the cadmium collodion to give the softer image of the two; but they are both good, and

some of my best portraits have been taken with them. By using sometimes pyrogallic acid, and sometimes sulphate of iron, and occasionally both on the same plate, it is possible to obtain either a soft, delicate effect, or a bold and hard picture. The cadmium collodion does not appear to deteriorate by keeping in the iodized state."

Included under this same head of "Suggestions for Improvement," &c., we give the following, also from the pen of Mr. Sedgfield: "Lately, when taking interiors, I have adopted a suggestion of Mr. Sutton's, by adding strong alcohol and soluble cotton, with a little more iodide, to the samples of collodion which I have by me, in order to get a pappy film capable of retaining its moisture longer than the ethereal and skinny mixtures. My experience of this kind of work has been so far satisfactory that next season I shall carry the plan out more regularly, although I cannot say whether such a collodion is equally suited for use on all occasions."

Having now concluded the first division of our Report, viz. that which refers to the collodion prepared with simple iodides, we pass on to the second, in which is given the experience of those members of the Committee who have worked with iodide and bromide conjoined.

Mr. Fenton has used collodion sent to him from the Committee, in the regular course of his photographic practice during the past year, and has been at some pains to ascertain in what manner it ought to be iodized in order to secure the best results. His lenses have been almost entirely single ones, and of every variety of focus; the character of work—landscape and architecture, with occasionally interiors, and copies of drawings and sculpture. His experience is as follows:—"The collodion prepared with iodide of potassium only, ought not to be entirely rejected; it is useful on occasion, being sufficiently sensitive, and producing for some purposes a good quality of picture. It has, however, formidable drawbacks, such as soon becoming red and insensitive, and being liable to show white spots, often when used alone, but still more frequently when added to any other collodion." On the whole he gives preference to a mixture of iodide and bromide, which not only produces a far more stable collodion, but represents the colours of landscape scenery in a truer gradation, and brings out the sky and the foreground of the picture at the same time, without solarizing.

With reference to the salts which should be employed, Mr. Fenton has worked with a collodion prepared by Mr. Mayall, containing iodide and bromide of magnesium, and also with one made by Mr. Hardwich with the same compounds. The two collodions, however, did not agree in properties; for whereas the former was rather glutinous, and gave a fair share of intensity, the latter was limpid, and produced a weak negative. By mixing them together a good working collodion was obtained, with which some of the views of Oxford now in the Exhibition were taken. He is not inclined, however, to recommend the use of the iodide and bromide of magnesium.

During the months of August and September Mr. Fenton worked with plain collodion similar to that sent to the other members of the Committee, but iodized with iodide and bromide of ammonium and cadmium dissolved in the usual proportion of alcohol. It is extremely sensitive, and takes the dark parts of the picture well, but should be kept for some days after iodizing, or there will be occasional white spots and lines on the image. This collodion improves by keeping even for many weeks, and is so far good; but it is difficult to use it for landscape work in hot weather, because the least over-exposure destroys the intensity, and makes the picture flat and thin. A solution of sulphate of iron was used to develope, with mixed pyrogallic acid and nitrate of silver as an intensifier.

Mr. Hughes is an advocate for the employment of iodide and bromide conjointly in portrait collodion; and the reasons which he alleges are these: "Although with simple iodide a picture of superlative excellence may be taken by a skilful operator, yet to the amateur who desires only a good average result, with little liability to failures, bromide is an assistance. I would direct the attention of the Committee to this point."

Mr. J. Spencer communicates an account of some experiments which he has made during the preceding season with bromo-iodized collodion sent to him from the Committee. It appeared to him to be very valuable for some kinds of landscape work, and at the season of the year when the light is strong. In the winter, however, he works by preference with a simply iodized collodion containing only iodide of cadmium. As regards the proper developer to employ with bromo-iodized collodion, he commenced his experiments with sulphate of iron, but as the heat became greater he found pyrogallic acid to be sufficient.

In order to render the above observations complete, we require exact experiments on the comparative sensitiveness of the simply iodized and bromo-iodized collodions. These have not at present been made; and so far the Report is incomplete. Without doubt, however, the latter retains its properties very much longer after

iodizing, and has the merit of producing delicate half-tones, whilst a sufficient intensity can in most instances be obtained by carrying on the developing action with pyrogallic acid and nitrate of silver.

Mr. Thurston Thompson, a member of the Committee, works exclusively with the bromo-iodide. All the pictures which he has exhibited were taken with a collodion of his own manufacture, and he was unable during the last season to give such careful attention to the collodion sent to him as would justify him in speaking confidently of its merits.

The names of other gentlemen, members of the Committee, viz. Mr. Llewelyn, Mr. Maskelyne, Mr. Mayall, Count de Montizon, Mr. Spiller, and Mr. White, will not appear in this Report from the same reason.

Mr. Malone, on whom devolved the task of examining the formulæ as regards their chemical aspect, has expressed his full satisfaction with that by which the collodion sent to the Committee by Mr. Hardwich was prepared. He has assisted at the manufacture of the pyroxyline and collodion, not in small quantities but on a commercial scale, and has received a complete list of details and precautions which are necessary in order to ensure success.

In concluding this Report the Committee have much pleasure in expressing their opinion of the superior excellence of the collodion submitted to them by Mr. Hardwich, and they can confidently recommend the Society to stamp the same with the full mark of its approbation.

F. Bedford.	J. H. Morgan.
P. Delamotte.	H. P. Robinson.
Hugh W. Diamond.	Alfred Rosling.
Roger Fenton.	W. Russell Sedgfield.
C. J. Hughes.	J. Spencer.
T. A. Malone.	T. R. Williams.

*** In connexion with the above Report we beg to call the attention of our readers to the announcement made by Mr. Hardwich in our advertising columns, as well as to the letter of Mr. Heath at page 159.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

Mr. Horatio Ross, who was appointed by the Council of the Society to act as judge in the competition for the prizes offered for the best pictures exhibited at the Exhibition of the Society, has awarded them as follows:—

1. The Society's Silver Medal for the best portrait or group to Mr. H. P. Robinson of Leamington for his picture "Here they come."

2. The Society's Silver Medal for the best picture of any other subject, to Mr. James Mudd, of Manchester, for his view on the Coniston.*

3. The Maconochie Wilwood prize of £10, to be competed for by professional Members of the Society *only*, for the best photograph other than a single portrait, to Mr. Thomas Rodger, of St. Andrews, for his portraits of "Master and Miss Gordon."

On a Dry Collodion Process†. By Dr. Robert Paterson, of Leith.

[Read 10th January, 1860.]

The process which I am about to describe is not an entirely new one, but it is new in some important particulars.

The dry collodion process may be divided into two varieties: in the *first*, some resinous or other substance, as resin amber, gutta-percha, &c., has been mixed with the collodion; and, more recently, Mr. Hardwich has prepared a peculiar pyroxyline, which is said to answer well for this purpose. In the *second*, it has been considered necessary that a preservative coating be applied to the collodion after sensitizing and washing. This preservative has been composed of very various substances, such as gelatine, albumen, honey, dextrine, raspberry syrup, gum, beer, worts, &c.

From a careful microscopic inspection of plates prepared with these two processes, I am satisfied that we shall never get good results, after a short space of time has elapsed, without having a preservative coating to the collodion.

All the dry processes which I have seen recommended in the journals I have carefully tried, and they all proved more or less successful in my hands; but none of them ever gave me steady results, with the exception of the collodio-albumen process of Taupenot and the one I am at present about to advocate.

* We are happy to state that both these pictures may now be seen in the Exhibition of the Society in Pall Mall.

† The paper was illustrated by a number of negatives, 16×14 inches, taken by the process.

It appears to me that there is some grand error in all our present processes for procuring dry plates, seeing that, with the greatest regularity and care in the preparation, out of twelve plates exposed, we in all probability do not get four good negatives. There must be some cause for this continually-recurring error, and it occurred to me that we should find it to lie most probably in the indefinite washings which the plates undergo; that while we have a given collodion, a given strength of bath, a given preservative, and a given developer, we have an indefinite washing before the application of the preservative solution, and a still more indefinite washing afterwards. In order to avoid this, I have devised the following process:—

The collodion used was strongly alcoholic, but with the usual iodizing materials. The bath was 40 grs. to an ounce, with 20 minims of acetic acid to each ounce of bath. The plate, after being coated and sensitized and allowed to drip, is then to be placed in a given quantity of common water in a flat tray (38 oz. to a 16×14 plate) and thoroughly washed—washed in fact until we are satisfied that the water has acquired the same strength of nitrate of silver as the surface of the collodion has had left upon it. It is then to be properly dripped on clean blotting-paper, and coated with a solution of gum arabic, made of a thickness that will readily go through ordinary filtering-paper.

No further washing is now necessary; but, the gum solution being allowed to run off, it is then to be put into a drying-box and carefully dried by artificial heat. The exposure is about the same as that of other dryplates. With an ordinary meniscus lens, and a 22-inch focus, a plate 16×14 took 5 minutes in good light. I have always developed with pyrogallic acid, 2 grains to the ounce, with formic instead of acetic acid, and my results have been invariably steady and good. I may remark that there seems considerable difficulty in getting good results from any dry process with large plates, and this doubtless arises from the greater difficulty in manipulation. Although, therefore every one must not expect to succeed at once in getting good negatives by the above process on large plates, any one will find that with plates of a smaller size, and carefully prepared, he may go into the country with the security that he will bring home with him as many good negatives as he has exposed plates.

On the conclusion of Dr. Paterson's paper, Mr. Macnair said that he had been lately led to adopt common brewers' wort as a preservative coating to the sensitized plate; and the experiments which, in conjunction with Mr. J. T. Taylor, he had made with this material, convinced him that it possessed all the advantages claimed for the other preservatives now in use, with the additional advantages that it was always easily obtained and at a trifling cost. He had never had an opportunity of keeping the plates prepared with wort for more than three weeks before they were exposed, and had developed them eight days afterwards; but, from the complete success which had attended the preserving of these plates for that period, he had no doubt that they might have been kept for an indefinitely longer time. The development was completed in one minute, or at most in one minute and a quarter. He had also tried as a substitute for the wort a simple infusion of malt in warm water; and although the liquid so obtained differed very much in several respects from the wort, it was equally efficacious as a preservative to the collodion plate.

Mr. J. T. Taylor exhibited some stereograph negatives taken (by gas-light) by the process described by Mr. Macnair. These negatives, he said, had all been developed with the protosulphite of iron. Gallic acid did pretty well for developing them, but was not to be depended on so much as the iron developer. The iron was used of the ordinary strength for glass positives; but when very intense negatives were desired, a stronger solution, acidulated with acetic acid, might be used. Before developing, the negative should be washed in water to remove the preservative coating on the surface of the plate, which might interfere with the development.

Dr. Paterson said that, looking to the composition of wort and the infusion of malt, he had no doubt that they would be useful as preservative coatings; but he questioned if they could be successfully applied on a larger scale than to stereoscopic plates, and he did not believe that plates of the size which he had exhibited to the meeting (16×14 inches) could be prepared with this substance so as to act with certainty, which might be said of the process he had recommended in the paper which he had just read.

Some Members having expressed their dissatisfaction with Fothergill's process, Mr. Archibald Burns exhibited a collection of stereographs which he had taken by that process, and which excited much admiration.

A conversation ensued on the merits of the various dry processes, which resulted in the appointment of a Committee to examine and report on them to the Society.

After a vote of thanks to Dr. Paterson the meeting adjourned.

Exhibition of the Photographic Society of Scotland.

[Concluding Notice.]

A NEW name, at least in the Edinburgh Exhibition, demands notice—that of Mr. J. Dixon Piper of Ipswich, who contributes some subjects, both architectural and of general nature, which are of a very high class. His (No. 265) "Abbey Gate, Bury St. Edmunds," and (No. 292) "Norman Tower, Bury St. Edmunds," are on a large scale, and most effective photographs, and his "Old Curiosity Shop" (No. 150) very clever; but the finest, we think, of the specimens of this year is (No. 68) "Sutton, near Ipswich"—a park scene with cultivated pleasure-ground, and the reflections of the trees and reeds received on the surface of a glassy pool. The scene is the very essence of tranquil beauty, and the tone excellent.

Mr. Morgan, who has been a steady contributor to the Edinburgh Exhibition, is well represented this year by his scenes in Wales and Devon. The finest, we think, is (No. 63) "Pont Aberglas;" but where all are so good it is really difficult to adjust the order of merit. He is a most careful and successful photographer. Among his other contributions we would notice (No. 482) "West Siabod," in which the distance is charmingly rendered; (No. 394) "Water Mill," and (No. 674) "Ledder Bridge." A frame containing four pictures, chiefly near Dunkeld, by Mr. Kirkland (Nos. 363 to 366), deserves notice; and some small wood scenes about Ochtertyre, by John Henderson, possess considerable merit.

We have naturally been led to speak first of the larger and more ambitious specimens of the Exhibition; but, in truth, the most wonderful of its contents are a set of gems of very small size by Mr. Wilson of Aberdeen, unquestionably, as we think, the most successful artist for the stereoscope in Great Britain. The pictures to which we allude, however, are not stereoscopes, but of a size slightly larger, and of these the most striking is the frame (No. 41), "Six Studies of Evening Effects on the Loch of Pach, Aberdeenshire." The scene itself possesses no peculiar features: a somewhat dreary Loch with reeds rising high in some places, and a distance of low hills present no attractive features; but how are these common-place features redeemed by the sunset effects behind!—in some the sun seen full before us with a *cortége* of golden clouds, in others half-dipped beneath the horizon, and in one the faintest gleam on the edge of the cloud shows where he "has sunk to his rest"; while on the surface of the lake the changes corresponding to the waning light or rising breeze are given with magical accuracy. Though less wonderful, Mr. Wilson's other frames (Nos. 311–316, 630–635, 665–660) are hardly less attractive. "The Interior of Roslin" (No. 633), (No. 659) "Fingal's Cave," and (No. 632) "Falls of the Garavalt," exhibit the *ne plus ultra* of fine feeling and delicate manipulation. How charming would be a volume of Scottish illustrations on this small scale, which would at once illustrate the perfection of the art, and be within the power of any one to acquire at a moderate rate! We recommend this hint to Mr. Wilson's consideration.

A series of Indian views and other subjects, by A. Williamson, occupies a conspicuous place in the Exhibition. The figure-subjects are certainly more curious than beautiful. A more unintellectual, nay, actually hideous set of creatures than those which are grouped together in No. 559, "Bengalee Clerks," and (No. 561) "Bengalee School," it would be difficult to conceive. Still they bring the subject most vividly before the mind. Of the landscape compositions some are exceedingly good, particularly the "View on the Hoogly" (No. 558), and the "Chinese Burying Ground at Calcutta" (No. 552).

More interesting, however, from their subjects, is the collection of Spanish views, chiefly at Seville, contributed by French Gascoigne—we believe, an amateur. They have just one defect, but it is a serious one: the attempt to give an artificial gradation of shade from the zenith to the horizon is a total failure. The darkness at the top is so overcharged, and the change to light so sudden, that the effect is most disagreeable. This is much to be regretted, because in other respects these photographs are excellent. (No. 679) "Grand Patio in the Alcazar, Seville," and (No. 680) "Gate in the Alcazar," and (No. 81) "View, from a neighbouring Roof, of the Cathedral, Seville," are particularly good.

Our space is so limited that we cannot notice as they deserve the numerous contributions from amateurs, which worthily maintain their ground even when placed beside the works of professional artists. The works of Mr. Horatio Ross, Mr. Herries, Dr. Walker, Mr. Watson, Mr. Adam, Mr. Scott Elliot, and Mr. Cosmo Innes, are in many respects an improvement on those of last year. Mr. Raven, though his contributions show the same mastery of the wax-paper process, are less interesting in point of subject, and, it appears to us, have not been printed with the same skilful gradation as those of last year. We miss the fine architectural wax-paper studies of Mr. Kinnear, the Honorary Secretary, who is pro-

bably too much occupied with erecting buildin g on *terra firma* to find much time for delineating them on paper.

A frame of studies by Lady Matheson (Nos. 236–239) is interesting, particularly the portrait of Lord Chancellor Campbell standing beside the deer which the learned Lord killed in Scotland in 1858, and, obviously, well satisfied with the feat which he has performed.

M. Silvy, who, we believe, has now settled in London, has sent a considerable number of specimens, but, generally speaking, of a very different kind from his fine contribution of last year, "A French River." Even that performance, eminently clever as it was, was not without its drawbacks, for the extreme darkness of the sky was not in harmony with the tone of the rest of the landscape, and it was easy to perceive that the sky and the body of the landscape had been printed from two different negatives. This year he sends but one landscape, "La Mare aux Cygnes," The Swans' Pool (No. 393), and it is in every respect inferior. But in return he contributes some very clever little scenes which he calls "Cartes de Visites"—en plein air, à l'intérieur, et équestres, and one admirable "Portrait of a Lady" (No. 916), which, for grace of pose and agreeable treatment, cannot be surpassed.

And this brings us to speak of that which to many, though not to us, may appear to be the most interesting portion of the Exhibition, namely, the portraits. These are very numerous; and certainly every year displays an increased triumph over the great difficulties that attend photographic portraiture. Year by year it falls more into the hands of regular artists, or of those who, by long experience, have acquired the eye and the feeling of the artist. There is more life and nature in the attitudes,—more avoidance of harsh contrasts of light and shadow,—a greater approach to the successful miniatures of former days; while it has rendered to the public this eminent service, that it has wholly extinguished the third-rate style of miniature painting with which it was infested. While it effected this most beneficial change, it cannot but be regretted that it interfered most seriously even with high art in miniature painting, and drove many artists, who had won for themselves a high position in the public estimation, altogether to abandon the art. Others, like Mr. Kenneth M^cLeay, whose beautiful miniatures were alike conspicuous for admirable drawing and the greatest force and freedom of treatment, bowing so far to the storm, have united photography to their original art, by employing a photographic ground as the basis of colouring; and the numerous contributions of this gentleman to this year's Exhibition show what an admirable result may be effected by their combination in hands like his. With the exception of a few by Claudet in a former exhibition, and some by Caldesi and Montecchi, these are the first coloured photographic portraits which have appeared to us satisfactory. We would remark also the peculiar charm which is given to them by the introduction of exquisite bits of landscape in the background, as in those of the "Highland Boy" (No. 697) of Mr. Alex. M^cDonnell (No. 690), and of Dr. Cook's "St. Andrew's," where Cardinal Beatoun's Castle comes in with very fine effect. Much of the same praise is due to the works of Mr. Musgrave, who has followed a similar course. The portraits of Mr. Halket (No. 751) and of Mrs. Edward Douglas (No. 753) are remarkably pleasing: and from the number of specimens contributed both by her and Mr. M^cLeay, we are glad to perceive that the public appear to appreciate the advantages which may be derived from this combination of Photography with Miniature Painting.

We miss in this Exhibition the contributions of Claudet which on former occasions adorned the walls of the Exhibition, though some fine specimens by Mayall and Maule and Polyblank go far to supply the want. The portrait of Lord Aberdeen (No. 808) by the former, and those of Montalembert (No. 807) and Lord Carlisle (No. 795) by the latter, are extremely interesting; and that of the Prince of Wales, by Mayall (No. 666), is peculiarly happy in the manner in which it has caught His Royal Highness's gentle and amiable expression. Near it, too, is another fine portrait of a lady, by the same artist (No. 663), extremely graceful and simple in attitude.

But, unless we are misled by national partialities, we are strongly inclined to say that the portraits by Rodgers of St. Andrew's are superior to any received from English artists. Most of them are untouched—a great merit in our eyes; for it enables us to appreciate exactly what the unaided efforts of photography can do in skilful hands. No. 266, "Portrait of a Lady," is a charming copy of a charming subject. Nothing can be simpler, more modest and graceful than the figure—nothing more artistic than the treatment of the accessories. No. 510, Colonel Henderson, extremely vigorous and characteristic, yet abounding in half-tints. Nos. 85 & 87, two remarkably pretty groups of Children, and No. 839, "Group: F. Wright and family," a composition of a good many figures, are among the best of the numerous contributions of this favourite artist.

New York contributes one fine specimen of portraiture on a large scale (No. 269), by

Brady, though it appears so much touched that it is not easy to determine how far it is the work of the sun, and how far the work of the artist. His other contributions are less successful. The "Portrait of President Buchanan" (No. 570) is spoiled by the injudicious projection of the leg and foot, which assume almost elephantine proportions: and the portraits of the American Senate, though historically more interesting, seem to us not so well executed as those of our own municipal body by M'Craw, where Provost Broun Douglas and Ex-Provost Sir John Melville sit surrounded by a galaxy of town councillors. Several others by McCraw are well deserving of attention.

We regret that Mr. Tunney, instead of his usual vigorous and characteristic portraits, has sent only a frame, containing groups on a small scale, which, from the very nature of the subject, embracing twenty or thirty figures, are rarely manageable. In one, the members of the Beef-steak Club are arranged, in the Leonardo da Vinci fashion, on one side of a long table, of which we can only say that the manipulation is good. The best is a group of Soldiers and Officers at Stirling Castle, in which there is considerable variety of attitude. His frame also contains two very good views of Edinburgh.

From the very numerous contributions of Messrs. G. and D. Hay it is difficult to make a election; but Nos. 23 and 140 may be menioned as among the best.

Cramb Brothers, of Glasgow, appear to us ess successful than last year, particularly in heir larger portraits. There are also some eformities in the scale of life, which ought ever to have been admitted into the Exhibiion.

We have been obliged to pass over many which we would willingly have noticed; but ur limited space compels us to conclude.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

[R. SKAIFE read a short paper on Photoraphic Instantaneity, by way of introducing to ie meeting his new photographic instrument, hich the inventor calls a Pistolgraph. After cplaining its construction, he gave a practical lustration of its working, by taking two or ıreo rapid pistolgrams of one of the gaslights, l of which he excited, developed, and fixed, r plunging each plate successively into three rs containing 1½ ounce of fluid each. He ıen explained how, by superposition, a transırent positive was taken sufficiently defined to yield by one operation of enlargement a negative from ten to fifteen times the diameter of the original pistolgram, half a dozen successful examples of which, plain and coloured, were handed round to the members for their inspection, together with two or three cases of photo-pistolgrams chromocrystallized, including a view of the last Greenwich election, a boat-scene on the Thames, and sundry pictures of dogs, horses, and children, the novelty and beauty of which elicited repeated expressions of admiration coupled with surprise that such a pistolette should have been capable of producing them.

To a question put by a Member, why the machine was called a pistolgraph instead of a camera, Mr. Skaife was understood to say, because, amongst other reasons, the instrument, with the exception of its lenses, had nothing in common with ordinary photographic cameras, so named from their similarity in outward shape to the camera lucida invented some three hundred years ago by a Neapolitan savant.

The CHAIRMAN, in proposing a vote of thanks to Mr. Skaife, observed that, by whatever name the instrument was called, its performances indicated a competency to realise more satisfactory portraits of children than any other photographic camera known.

The Report of the Collodion Committee.

To the Editor of the Photographic Journal.

43, Piccadilly, 8th Feb. 1860.

SIR,—The business of the annual meeting of the Society having occupied so much time and attention last evening, I conceived that it would be desirable, looking at the importance of the subject, to adjourn both the reception and the consideration of the Report of the Collodion Committee, and I moved their adjournment accordingly.

Perhaps you will now allow me to explain, for the information of those who were not present, that in adopting the arrangement that was come to, by which the Report is to be published in the "Journal" of the 15th inst., and the discussion upon it adjourned to the March ordinary meeting, it was thoroughly understood that this publication is made in strict accordance with the following rule of the Society, viz.:—"That in printing papers presented at the ordinary meetings, the Council do not thereby adopt the views or opinions of the authors."

VERNON HEATH.

Mr. Kilburn and Mr. Hering.

To the Editor of the Photographic Journal.

137, Regent Street, 10th February.

SIR,—For the information of the readers of the 'Photographic Journal,' I beg to state that my reply to Mr. Kilburn's charge against me at the last meeting of the Society will appear in the next Number of the Journal.

I shall feel obliged by your inserting this notice. H. HERING.

*** After the receipt of the above note from Mr. Hering, that gentleman has forwarded us a statement in reply to Mr. Kilburn, which necessity compels us to transfer to the columns of our advertisements.—ED.

Actinometry.

To the Editor of the Photographic Journal.

SIR,—Your last Number contains an article describing a new Actinometer. My first impulse upon seeing it was to write to you pointing out the sources of failure which are inherent in this instrument; but the writer, before concluding his paper, displays them sufficiently to prevent any working photographer troubling himself with so unsatisfactory an instrument. I now write from a different motive. It is nearly two years since I constructed an actinometer precisely identical with the first described by Dr. Wood, and discarded it as useless. In March 1858, I began a series of experiments, with the hope of finding some means of measuring the actinic force which should be available in the various circumstances in which a photographer has to work. The very imperfect success I met with discouraged me from publishing the results of my experiments at that time; I am now induced to offer them to the photo-chemical world in the hope that they may save others from working upon unprofitable ground, and perhaps suggest new fields for experiment. I transcribe the notes just as they stand in my journal, trusting that those who are interested in the subject will excuse the imperfections which naturally belong to private memoranda, adding just such comments as may appear necessary to make them intelligible:—

No. 1. A tube 10 inches long, $\frac{1}{4}$ inch bore, closed at one end, was filled to the depth of $2\frac{1}{2}$ inches with a solution of peroxalate of iron, the remainder filled up with mercury, and inverted into a cup of mercury. When exposed to light in the window, it remained for several hours before showing any indication of action, but gradually the action began, and during the first day the total unabsorbed gas was a column of about $2\frac{1}{2}$ inches. It was placed in a dark closet for the night, during which time there was a liberation of about $\frac{3}{8}$ inch of gas. During the second day's exposure in the window, the gas liberated filled up the remainder of the tube (*i. e.* $4\frac{1}{2}$ inches), displacing all the mercury.

No. 2. A strong solution of persulphate of iron mixed with an equal measure of saturated solution of oxalic acid gave results the same as No. 1.

No. 3. With the view of trying solutions containing free nitric acid, it became necessary to avoid the use of mercury. To effect this, and at the same time to render the action more visible, the following apparatus was constructed. Two tubes were fitted to a 3-oz. flask by means of a perforated cork; the longer tube (of $\frac{1}{4}$-inch bore) passing from the bottom of the flask through the cork to the height of about 12 inches, the ascent of the liquid in which indicated the amount of action; the other tube, simply passing through the cork, was fitted with a stopper for the purpose of letting off the accumulated gas.

The flask was filled with equal parts of nitric acid of sp. gr. 1·38, and saturated solution of oxalic acid. Twelve hours' exposure to daylight did not produce any evident action.

No. 4. The same solution as No. 3, with the addition of a fluid drachm of strong solution of persulphate of iron. Several hours elapsed before there was any appearance of action, and not until the second day did it become conspicuous. During the second day the evolution of gas went on steadily, raising the liquid in the long tube 8 or 10 inches above the point where it began in the morning, but it continued to rise $1\frac{1}{2}$ inch in the dark. The third day it was placed at its original level, and more closely watched; its ascent did not begin for about an hour, but then went on at about the same rate as before.

No. 5. A similar arrangement on a smaller scale was filled with the persulphate and oxalic acid solution No. 2. It gave similar results, but was more sensitive to light, and did not quite cease its action upon being placed in the dark for forty-eight hours.

No. 6. For the sake of still greater sensitiveness, another form of apparatus was constructed as follows. A tube 30 inches long by 0·05 bore, open at both ends, was fitted by means of a perforated cork into a tube 10 inches long by 0·25 bore, open at one end only, the longer tube reaching to the bottom of the short one: as the cork used for the connexion was forced into the wide tube the liquid rose in the narrow one, but by pulling the narrow tube through the perforation the liquid could be brought

down to zero on the scale. The total absence of air at the commencement of the action, in this form of instrument, diminished the error introduced by changes of temperature; and being used in a horizontal position, the error resulting from the pressure of a long column of liquid was obviated, and the chance of gas escaping effectually provided against. It was hoped that the body of sensitive solution being reduced to $\frac{1}{4}$-inch diameter would give prompt indications both of the commencement and cessation of the action of light upon it.

When charged with the solution No. 4, it rose at first slowly, and then rapidly, but still with the same objection as before, that the rising of the liquid continued in the dark.

No. 7. As Professor Draper states that peroxalate of iron was quite permanent in the dark, it was thought advisable to try its action with the last form of apparatus, it being the most satisfactory that had been tried. The results were the same as before: no visible action for several hours, then rapid action, which did not stop immediately upon being placed in the dark.

Being thus discouraged from the pursuit of any process depending upon the evolution of carbonic acid, it was thought probable that a sensitive and self-developing paper might be prepared from such materials as would give a great degree of sensitiveness together with a great degree of constancy.

No. 8. Thirty-nine grains of oxalate of silver, with 1 oz. of water, and sufficient ammonia to dissolve it. This solution, when spread upon writing-paper and dried, possessed a slight yellowness, but was not appreciably changed by exposure to gas-light, nor by heat, until it became almost sufficient to change the colour of the paper itself.

No. 9. Pure chemical filtering-paper saturated with ammonio-oxalate solution (No. 8) and dried in the dark, was scarcely altered by a quarter of an hour's exposure to sunshine. Gallic acid developed it to a deep brown, but had the same action upon the unexposed paper.

No. 10. Two pieces of oxalate paper (No. 9) and two of pure filtering-paper were excited, one of each with ammonio-nitrate 40 grains to the ounce, the others with pure nitrate 40 grains to the ounce, and dried in the dark. Two minutes' sunshine and fifteen minutes' diffused daylight made very little change in the colour, the simple nitrate being least affected. Pieces of each were developed with gallic acid; they all turned dark; simple ammonio-nitrate being deep black, oxalo-ammon. nitrate next, simple nitrate third, and oxalo-nitrate fourth, being a rich deep brown.

No. 11. Solutions of chloride of ammonium, $\frac{1}{2}$ drachm to the ounce; nitrate of silver, 2 drachms to the ounce.

A piece of finest blotting-paper, 4 inches square, was saturated with 15 minims of the chloride solution, dried, and then treated with the same quantity of the silver solution, and dried in the dark; a strip of this exposed a quarter of an hour to sky-light without sunshine turned lilac-blue. A strip of the same moistened with mucilage before exposure acted in precisely the same degree.

No. 12. Solutions of peroxalate of iron and ferricyanide of potassium mixed gave a green liquor, a few drops of which were exposed upon an evaporating dish to air and light, and a few drops in a narrow tube to light only. The drops upon the dish continued to look green for a quarter of an hour or thereabouts, but a blue precipitate could be seen in them when carefully examined. Where the solution had drained down the side of the dish, leaving a very thin film, the action was more conspicuous, and on the unglazed edge of the dish it was most conspicuous, changing very perceptibly in one minute. In the tube the action was similar: where the sides of the tube were simply moist with the solution they became pale blue in one minute, and fine rich blue in three minutes, whereas the liquor in the full portion of the tube continued green with a faintly visible blue precipitate.

No. 13. A piece of fine blotting-paper was saturated with the solution No. 12, and dried in the dark; it turned first yellow-green and then blue-green. In 48 hours (not having been kept in absolute darkness) it was blue with only a tinge of green. Another slip of paper dipped in the solution and exposed to light was rapidly changed into blue. In one minute it was blue-green, in two minutes blue, gradually turning very rich and deep; but by a long exposure (five or six hours) it lost part of its depth and richness, which it again recovered by keeping in the dark. These exposures began 8·45 A.M., a fine mild day in March, without sunshine.

No. 14. A little of No. 12 solution after standing in the phial for 10 hours (the light having been pretty well excluded by a covering of brown paper) was a bright green, but so deep that it could not be seen through, though the diameter of the phial did not exceed $\frac{1}{2}$ inch, but there was no visible precipitate.

No. 15. Comparison of

A. Pure paper charged with No. 12 solution and dried.

B. Paper charged with a mixture of two parts No. 12 solution and one of mucilage, and dried.

C. Glass coated with No. 12 solution and mucilage, dried.

D. The same as A, but oiled before exposure.

E. The same as A, but exposed wet.

C was not of uniform colour when dry, the parts where the coating was thin being blue, the others varying from that to yellow-green. A and E after ¼ hour exposure were rich blue, A being a little inclined to blue at the commencement, and continuing bluer to the end. A, B, and D, compared together during exposure: by transmitted light, B was best, D next, and A least satisfactory; by reflected light, B was best, A next, and D least satisfactory.

No. 16. A piece of fine tissue-paper moistened with No. 12 solution. A piece of glazed writing-paper moistened on one side with the same. A piece of thick and a piece of thin photographic blotting-paper were moistened with a mixture of one part of No. 12 solution and 5 parts of water, and all dried in the dark. The object of diluting the solution for these two papers was that they might contain about the same quantity of chemicals per square inch. The tissue-paper darkened most in drying, and gave the least change on exposure. The others dried about equally well; they gave a distinctly visible change in half a minute, most clearly defined upon the writing-paper, next on the thick blotting-paper, and least on the thin. The letter paper was compared with the gum paper No. 14, and was found to act the better of the two.

No. 17. A slip of writing-paper and a slip of white demy were dipped into the solution No. 12 and blotted off; they both acted more quickly than the dry paper, and the demy the more quickly of the two.

No. 18. Sulphocyanide of potassium, 40 grs. to the ounce, was mixed with peroxalate of iron, and *no red was produced.*

No. 19. Sulphocyanide solution, with an equal measure of tincture of perchloride of iron, gave an intense orange red, which was destroyed without access of light on the addition of oxalic acid, or oxalate of ammonia.

No. 20. Four papers were prepared as follows, and exposed for one day:—

A. Sulpho-cyanide of iron on demy; its colour was reduced to about half on the exposed portion.

B. The same solution on gummed paper; its colour was very little reduced.

C. The same solution with the addition of oxalate of ammonia in an insufficient quantity to destroy the colour; its colour was less than half on the exposed portion.

D. The same as C, but on gummed paper; its colour was slightly reduced on the exposed portion.

No. 21. Sulphocyanide solution exposed in a tube 0·05 bore, was very slightly bleached by two days' exposure in the window.

No. 22. A film of oxalate of lime was spread upon paper and moistened with the sulphocyanide solution. It did not decompose spontaneously, nor did it appear to be more readily affected than the simple sulphocyanide paper.

No. 23. Two slips of fine blotting-paper were charged,

A, with tincture of perchloride of iron.

B, with solution of peroxalate of iron.

After being dried in the dark both gave red stains with a drop of sulphocyanide of potassium, but A much the most powerfully. Exposure to diffused daylight for five minutes gave a very faint change of colour in the papers; ¼ hour a very distinct change; three or four hours almost took the yellow colour out of the upper surface of the chloride paper, and converted the delicate yellow-green of the oxalate into a pale grey. The effect of the sulphocyanide of potassium upon the paper after exposure was to produce a diminished stain, in some degree proportionate to the length of exposure; the oxalate being most sensitive, but still giving a very evident redness with the sulphocyanide.

No. 24. Other portions of the papers No. 23 were drenched with a solution of honey, one drachm to the ounce, and dried in the dark: they were both paler than the paper without honey, and exposure to light seemed to have less action upon their colour (the oxalate being already almost colourless). Examined with sulphocyanide of potassium at similar intervals to No. 23, the results were the same in the case of the chloride, but greater sensitiveness in the oxalate, the longest exposure having quite destroyed its capability of being stained with the test.

No. 25. A piece of thick photographic blotting-paper was sized with a solution of isinglass containing chloride of ammonium 30 grains to the ounce, and excited with nitrate of silver 120 grains to the ounce, blackened by several days' exposure to light (it was not an intense black, rather a dark purple grey).

A. Solution of iodide of potassium 70 grains to the ounce.

B. Solution of iodide of *potassa*, containing an equal quantity of iodine per oz., prepared by mixing 10 grains of iodine with about 1¼ drachm of solution of potassa (P.L.), being just sufficient to decolorize the iodine.

Slips of dark chloride paper No. 25 were moistened with the two solutions and exposed to light. B acted more quickly than A, and more quickly still where a small spot of the

paper had missed the chloride and size and was dark with pure nitrate solution.

No. 26. Two slips of dark chloride paper No. 25 were moistened with compound tincture of iodine (P.L.), one exposed to light and the other to dark: both were equally bleached in ten minutes.

No. 27. A piece of nitrate paper was prepared thus: 16 drops of nitrate of silver solution, 120 grains to the ounce, were poured upon a glass plate, and 16 square inches of fine photographic blotting-paper laid upon it. Exposure to twelve hours' daylight produced but little darkening. Exposure to a heat of 212° in a test-tube water bath for five minutes about doubled the shade, or rather more, making it about the colour of a freshly-ground slate.

No. 28. A piece of chemical filtering-paper saturated with ammonio-nitrate 40 grains to the ounce, dried and heated in a test-tube water bath, produced but a very slight colour; exposed to daylight it slowly turned brown.

No. 29. Oxide of silver rubbed upon glazed writing-paper produced an uneven pale brown, which upon long exposure (a week or ten days) to the sun and sky turned nearly black.

No. 30. Samples of the above papers No. 27, 28, and 29, were touched with the solutions of iodide of potassium and iodide of potassa No. 25. The ammonio-nitrate paper was most sensitive to the bleaching power of the iodides, and the darkened oxide paper least sensitive.

The difficulty in obtaining a definite degree of darkening in the above papers, and the fact that their condition so much influences their sensitiveness, indicate that they are not trustworthy for actinometric purposes, great certainty and great sensitiveness being equally essential to success.

No. 31:—

Grape sugar	5 grs.
Nitrate of silver	5 grs.
Solution of ammonia, sp. gr. ·880	15 drops.
Solution of potassa (P.L.)	10 drops.
Water sufficient to make up	2 drms.

Photographic blotting-paper was saturated with the above solution, and allowed to dry in the dark; as the ammonia evaporated it became a rich brown colour; the change of colour was produced immediately upon heating a sample.

No. 32. The iodide solutions No. 25 quickly bleached the above (No. 31) paper which had been prepared without heat, but only slowly that which had been heated. The former was found to bleach with equal rapidity in the light and in the dark; the latter was not tried in the shade.

No. 33. A graduated tube ½ inch bore was filled with hydrogen, and inverted into a solution of perchloride of iron (made by saturating commercial hydrochloric acid with peroxide of iron) and exposed to daylight and sunshine for 24 hours: no visible change in the volume of the gas took place. The experiment was repeated with a dilute solution of the chloride, but without visible results.

No. 34. Carbonate of copper was acted upon with tartaric acid, and then dissolved in solution of ammonia. Exposed in a tube of 0·05 bore, it did not show any decolorization in three days.

No. 35. Tartrate of copper as above dissolved in solution of potassa gave a paler solution than the last; it was exposed in a similar manner, with negative results.

The results of Nos. 9 and 10, compared with those preceding, show how little dependence can be placed upon theoretical considerations. The oxalate being pre-eminently sensitive among the iron-salts, and almost free from photographic properties among the compounds of silver, what could have appeared more promising than that the silver, under the influence of light, should have yielded up its oxygen to the oxalic acid? ($Ag. O, C_2 O_3 = Ag. + 2 C O_2$.)

But while we are thus cautioned against over-confidence in that which is theoretically hopeful, we should feel stimulated to try all things which show any chance of success. It is known that a mixture in equivalent proportions of hydrogen and chlorine is the most sensitive of all actinometric combinations. It is known also that perchloride of iron yields up one equivalent of its chlorine under the influence of light; and yet, in No. 33, the volume of hydrogen was not visibly reduced by a long exposure. Perhaps, if the chloride of iron were replaced by some other agent which we would expect to act in the same manner, we might obtain results which were hoped for in the experiment just quoted; the following suggest themselves for trial:—Hydrogen standing over a solution of chloride of soda, or iodide of potassa; sulphocyanide of iron with some photographic reducing agent, such as tannates or gallates, &c.; peroxalate of iron paper containing chloride of gold.

The evidence obtained in No. 4, and several of the other experiments, tends to show that it is not merely the absorption of the gas which prevents its immediate indication, but a species of chemical inertia requiring to be overcome, and afterwards resulting in the momentum which continues the action when light is excluded. If my memory serve me right, this has been rigidly demonstrated elsewhere.

That the amount of inertia is in some degree proportionate to the quantity of chemicals or the volume of liquid, is indicated by experiments 12; also by 15 B, in which the chemi-

cals are diluted with mucilage; by 15 C, in which the thinly-coated parts were bluest; and by 17, compared with 15 A and E, from which it appears that blotting off the superfluous liquid increased the sensitiveness.

Experiments 27 and 28 show a striking want of photographic activity in pure nitrate, and ammonio-nitrate paper, when the paper itself is chemically pure. In our ordinary printing processes how much depends upon the presence of some matters which we scarcely think of as photographic agents!

Experiments 25 to 32 indicate the remarkable fact that silver, in papers darkened by light, requires the cooperation of light with the iodides for its rehalodization, that the amount of light in the second process is probably in some degree proportionate to that in the first, and that when light has not assisted in the reduction of the silver compound, it is equally unnecessary for effecting recombination.

Barnard S. Proctor.

Grey Street, Newcastle-upon-Tyne, Feb. 3, 1860.

Practical Observations upon Photographs in their Relation to Art. By Alfred H. Wall.

[Concluded from p. 143.]

The faults I most commonly meet with, in otherwise good photographic landscapes, are a want of shadow and a want of contrast, arising in many cases, I doubt not, from the operator's common and almost instinctive dread of the strong lights and darks of nature resulting in a "soot and whitewash" effect in his picture. I think I have brought down sufficient proof, in the specimens I now show, of the exaggerated nature of this fear. The stops used in lenses are so various and important in their effect that you must permit me to advise our beginners to try some few experiments in this direction, if they have not already done so. I am inclined to think too small a stop disadvantageous. Long exposure may destroy some force of effect in the more minute details of the lights; but this is more than compensated for by the greater transparency, detail, and purity obtained in the shadows. Here again, gentlemen, we meet with demands beyond that of the mechanical: here the taste and artistic knowledge of the photographer will surely be of greater service than his manipulatory and chemical skill; for the last is useless without the first. When he takes out his apparatus, he has not only to choose his scene with reference to light and shade, as related to pictorial effect, but to produce really *artistic* pictures, he must also study the *chiaroscuro* with reference to the peculiar character of the chosen subject, inasmuch as his pictures are, apart from colour, as capable of conveying sentiment as a painter's. This is a fact too commonly overlooked. The mere representation seems nearly always to bound a photographer's aim (and thus it is that there is a strong impression on the public mind that the photographer's occupation is, after all, only worthy of being classed among the mere handicrafts). For instance, gladness abounds in the brilliancy of sunshine; placidness and peace speak most eloquently in the harmonious blending of subdued tones; and a general gloom, with intense black shadows, has a grandly powerful voice when associated with the rugged and the desolate. In printing your picture, its colour may also tend greatly to enhance the sentiment and general effect. I must not dwell longer upon this, however, but content myself by adding that taste, elegance, and expression should characterize all your productions.

Barnard in his excellent work upon Landscape Painting, while praising photographic landscapes for their perfect representation of tints and shades, says—"It must, however, be confessed that even in the most perfect of these philosophical productions a certain amount of pictorial effect is wanting, and a deficiency is felt of that concentration of interest caused by a more artistic application of the laws of *chiaroscuro*." This is unfortunately but too true, although it is by no means necessarily so.

Another element of the picturesque has been greatly neglected by the photographer, viz. atmospheric effects.

I do think there never was a greater blunder made than that of destroying the aërial perspective of the extreme distance by obtaining the hard line of a cut-out horizon, and the glaringly prominent truth-and-beauty-destroying absurdity of *a white-paper sky*. If we *must* have clean skies, and *will* sacrifice atmosphere and perspective to obtain them, why on earth need they be *white*? Are we not able to graduate them with the greatest ease. from a gleam of light near the horizon, upwards, into a tone of any depth? Or, better still, cannot we take a second negative of the identical sky spread above our view, and by double printing give our picture an amount of perfection it otherwise can never claim? The hard horizontal line would even then remain, but it might at least be modified by the aid of a little wool or silver-paper in the printing process.

The effect of atmosphere is also too little appreciated in photographing distance, although it is the most enchantingly picturesque of all mediums, lending that soft, dream-like ob-

scurity to the fading objects as they dwindle and recede into air, which is most poetically expressive of all the charms of ever-varying nature. Clear, brilliant days, for distant landscapes, may give that wondrous diversity of detail and distinctness which charms the uneducated eye; but after all a map has similar qualities in much greater perfection, without being either picturesque or beautiful. Partially condensed vapours and the semitransparent gleams of partial sun-light are in themselves fruitful sources of effects which rouse the artist into a fervour of admiration and a fever of ambitious anxiety. Most people suppose that such beauties defy our art; but I have seen many photographs in which their glorious effects have been very faithfully rendered. You may perhaps remember a stereograph called 'The Rising Mist,' published some time since. I hoped I should have produced this and others illustrative of atmospheric perspective, with some I shall now send round. [Wilson's sunsets and other fine photographs were here shown.]

Not to dwell longer upon landscape photography (as my motive is rather to call the attention of Members to the wide field open to them for study, and the many subjects upon which it is desirable we should have good papers, than to give any one of these matters that attention and time which it justly demands), I will now conclude with a few observations upon portraiture.

The remarks made upon grouping will apply with equal force here.

The position of a sitter should be such as will display the greatest variety of graceful undulating lines, or be the most characteristic of the individual.

The head should represent the principal light; and minor lights should graduate from it, as a focus, to the deepest shadows. The effect will derive great force from the judicious introduction of a spot or focus of intense dark somewhat near the highest light; of course this so-called "spot" must not offend probability, nor destroy harmony.

Photographers are not, as a whole, aware of the great importance to be attached to the preservation of pure whites. If we consider that the lights and shadows of nature range from the intense brilliancy of white light to the absolute darkness of a nearly total deprivation of light—while a photograph can only represent this vast scale by the few tones graduating from white paper (generally seen in a subdued light) to shadows certainly not black, being considerably lighter, as a surface reflecting light—we shall then see how important it is that we should not lessen our scale of tones by substituting grey for white. I do not know a better illustration of this than is to be found in the alabastrine process. Take an ordinary positive with its so-called whites of a light leaden hue —more or less—and whiten it with the alabastrine or bichloride solution, when you will discover that, as the picture whitens, it seems suddenly to grow softer and more delicate, and its contours much rounder and more forcible, —an effect to be traced solely to the introduction of pure white and the intensifying of the deeper shadows, or, in other words, to the increased compass of the scale of semitones.

The general faults in most photographic portraits are, the absence of reflected light—the over-exposure of the face, to bring out the details of drapery—and (I know I am about to propound heresy) the terrible sharpness of their definition, which I never can reconcile with binocular vision. (I do not recognise the thousand and one cheap abominations in our streets as photographs at all, so must not be considered as referring to such singular productions, whose general faults would alone demand a longer paper.) In illuminating the sitter, the light should enter at an angle of not less than 45 degrees. The amount of direct light should be small; and to give delicacy, transparency, and truth to the shadows, light should be reflected from white screens placed upon the shadowed side of the figure. The object to which you direct your sitter's attention should be dark, as it is less fatiguing to the eye than a light one would be, and also (by enlarging the pupil) improves its expression. Be careful to avoid so placing your white screens as to reflect a glare of white upon the eye. In giving ease to the pose, don't carry it into affectation, which is as great a fault as awkwardness and clownishness. The background should spread the light and aid in securing breadth. A very capital one is made by painting it with colour containing more turpentine than oil, and afterwards stippling in, or near, the centre, with the end of a large brush, a colour considerably lighter, graduating it from a centre into the colour first applied.

I must now conclude. In pointing out a new field for our studies, and dwelling upon its importance, I hope, gentlemen, you will assist me to bring forward papers of *an artistic character*, which, blending with the amount of practical, manipulative, and chemical experience we already possess, will tend to raise the art we all love high above the sneers and ill-natured attacks of a class of dreaming idealists, who would fain make an artist one of the most mysterious of the world's creations, and his productions things to be viewed with unques-

tioning faith and superstitious reverence. The cause of Art is at enmity with these worthies.

Early Calotypes.

To the Editor of the Photographic Journal.

Belmont House, Jersey,

SIR,—In your answers to correspondents you mention having received three photographs; in answer to which, I beg to say that I had the pleasure of sending them. I am sorry the letter accompanying them was mislaid, not because of its importance, but because it requires me to write again. I have much pleasure in presenting them for the acceptance of the London Photographic Society. I do so, not because of their merit or beauty, but as showing the object I had in their production—namely, the application of our beautiful art to the interesting object of portraying scenes of more general interest than mere portraits: how far I have succeeded I leave you to judge. From the fact of the general admiration they met with when first done, many of them as far back as 1847, both from professional photographers, amateurs, and artists in London, I thought they might now be of some little interest to your Society.

I have every reason to believe that they were amongst the first of the kind then attempted, and, as a matter of course, all done by the Calotype process; therefore I send them as in a humble degree illustrating that process, and not as being in any degree comparable with the Collodion process, in its present advanced stage. In those early days we had not the advantage of a 'Photographic Journal,' which is now so great a boon to the professional as well as the amateur, more particularly to us at a distance from the metropolis, the great centre of our art; I therefore sent a few specimens to the editor of the 'Art-Union Journal,' who was pleased to notice them in a very flattering manner in the Number for June 1847, page 231, to which I would beg leave humbly to refer you.

In a letter to me, received soon after, he writes to say that they had been so much admired by some of his artistic friends that he had to lament the loss of every one that I sent him, and requesting that I would send him another set of them, which I was only too glad and proud to do. It showed that they were really appreciated, for he sent me a valuable set of prints for them. Seeing that they were so much admired, I would have been glad to have turned them to some account, but the patentee, Mr. Talbot, interfered with the sale of them in England; I had therefore to content myself with a little fame and less fortune.

I sent a frame containing twenty Calotypes to the Exhibition of 1851, which are mentioned in the Reports of the Juries, I am sorry to say, only as mere Calotypes, without the slightest reference to the novelty of the application of the Calotype process to living subjects, which I consider they ought to have done. The omission could only have been the result of ignorance of the difficulties we had to encounter in getting up those subjects, and this I am sure you will admit when I tell you how my pictures were treated at the Exhibition. The description I appended to my pictures they had the audacity to cover over, and to add one of their own, a copy of which I send you:—

"Section 30.—William Collie, Artist, Belmont House, Belmont Road.—Specimens of Calotype, or Drawings on Paper instead of STEEL, by a process similar to Daguerreotype."

I had intended to have written to you long ago in reference to those pictures, that is, at the time the Photographic Committee's investigation of the fading of pictures was going on, but put it off from time to time until now; and if the observations I have to make be of any use, it may not be too late; at least, better late than never. They were all printed with the ammonio-nitrate paper, and fixed in the usual way. I, as well as most others, took it for granted that to fix them was to submit them to the hypo-sulphate bath for a certain length of time, and give them so many changes of water; then dry them, and they were finished. As to toning, I had not the least idea of such a thing; it was a mere matter of chance whether they were well or ill. Even now, after the lapse of eight years, the tones are by no means bad. So far as I remember, there was not one of them printed expressly for the Exhibition, but selected from those I had by me; no doubt many of them very carelessly fixed, with the exception of one. I had the misfortune to lose the negative of one of the very best pictures I had done, and, having only one copy of it, I determined to try and preserve it by submitting it again to a new hypo bath, which I did; and, although all the rest have in some degree more or less faded, I do not think the one alluded to has faded at all. They have been exposed in my room—a room with only one window, facing the north—ever since the Exhibition. Along with this letter I send you some others; if you think them worth showing at your ensuing Exhibition, I shall be very glad.

In reference to some of the pictures sent you, I cannot now enter into the way they were produced, but have merely marked the time some of them were exposed in the camera.

One (a portrait of a young lady smelling flowers) was done in twenty seconds, which was the shortest time I could arrive at then; the usual time, as you are aware, being from two to three minutes' exposure in the camera.

Wm. Collie.

P.S.—The three pictures marked 1, 2, 3, you will easily see, are collodion pictures. The views with natural clouds have, I think, some interest, because they are rather difficult to obtain, being usually overdone. The plan I adopted was this:—The developing solution I pour on all over the plate; when the clouds are sufficiently developed, I pour it off; then wash the plate. I then pour on the developing solution again, and keep it as much restricted to the parts requiring further developing as I can. I send you the result, as any hint may be useful to some one or other of your numerous readers,—that is, if you think so. The portrait I send because I think it a very good illustration of the gradation of light and shade obtained by bromides along with iodides in collodion.

I herewith send you twelve photographs.

W. C.

Reply to J. R. H. on the Use of Stops.

To the Editor of the Photographic Journal.

Sir,—Your correspondent "J. R. H." in your last Number says that in the experiments of the trials of lenses I sent you, they appear to have been tried without regard to the positions of the stops. I think he will see, upon consideration, that such was not the case; that in the double combination the stop was placed where Mr. Shadbolt (whom I hold to be no mean authority in such matters) says it ought to be to produce the flattest field, namely in front of, and close to, the front lens. With the Petzval it was between the lenses and close to the hind one (an arrangement made by the optician), which prevents it being placed elsewhere, although I have heard it does not make any difference if it be altered. Now with regard to the single lens: this is the only one that leaves room for questioning the right place of its stops; but as my maxim is to let well alone, and as I found it, in the place Mr. Ross made for it, to give me a perfectly flat field, I did not seek any other place for the size I used. The only advantage in using a larger stop nearer to the lens (if it gave an equally flat field) would be, working a little quicker, which for copying is not of much consequence. I am fully aware of Mr. Sutton's (of Jersey) experiments with sliding diaphragms; but I believe he has now abandoned this form, and returned to the old plan. If, however, J. R. H. can show me that by altering the size and position of the stop I can get rid of the curved marginal lines, I shall be very much obliged to him; otherwise I do not think his communication will affect or assist the value of my results.

I wish now to say one or two words of explanation on the remarks I made at the last Meeting. It might be thought that in saying a hard horny collodion was unfit for any description of pictures I was setting myself in opposition to Mr. Hardwich; but such was not my intention. I should have said, a hard *contractile* film made of unparchmentized raw materials, such as used to be made before the nature of pyroxyline was at all understood; and in the latter part of my observations, I meant that Dr. Norris had found (which I also have verified) that a porous collodion iodized with alkaline iodides and in a fluid state will give a very weak picture, but that if it is made with a small amount of alcohol (in opposition to the collodion for wet pictures), and iodized with cadmium, so as to render it a little firmer and to make it expand a little in a gelatinous state, it will then give much more intensity; and such I understood—and, on referring to the first column (near the bottom) of page 119 of the 'Journal' for January, still understand—to be the result of Mr. Hardwich's experiments. I believe, however, that Mr. Hardwich prefers for the dry processes a collodion made according to the recipe for positives and modified by the addition of a small quantity of caustic potash. I am rather inclined to think that, in a new, undecomposed collodion, the structure of the film has more to do with the result than the chemical nature, but that, by keeping, very important organic elements are called into play, which seriously modify its working qualities.

In conclusion, I beg to send you one or two copies of an old map taken on an 8×10 plate with a double lens which Mr. Ross modestly calls a half-plate one. I have marked on them the particulars of their manipulation.

Francis G. Eliot.

Upon the Use of Stops.

To the Editor of the Photographic Journal.

January 31, 1860.

Sir,—Some remarks, signed "J. R. H.," having appeared in your last Number, bearing upon a letter of mine inserted in the Journal of the preceding month, I may be allowed to explain that, in taking the form of the field for several lenses in succession with the stop at the same distance for each (their foci not differing much), my object was rather to exhibit the variation of field due to any change in the form of the

lens, when other things remained nearly the same. The stop was placed comparatively close, my wish being to delineate the field for a considerable angle of picture.

It will be quite right, therefore, to consider the fields there given as resulting only when the same circumstances are attended to.

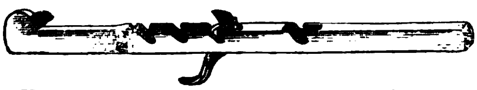
J. T. GODDARD.

New Plate-holder.

To the Editor of the Photographic Journal.

Dock Yard, Liverpool,
Jan. 19, 1860.

SIR,—I take the liberty of sending for your acceptance, and for notice in your Journal should you think it worthy of that distinction, a plate-holder of my contrivance, which having had for nearly two years, and proved to be an exceedingly useful instrument, I think may be found, on trial, equally so by others of your numerous readers.



For pouring on collodion or varnish, but more particularly for developing pictures up to the half-plate size—the limit to which this one extends,—I find it to answer remarkably well.

J. ELLACOTT.

*** The holder being made of hard wood, has a moveable clip or trigger, which holds the glass with perfect firmness; it is simple in its construction, very portable, and well adapted for its intended use; the drawback being its adaptation *only* to glasses of definite sizes.

Bad quality of Light this Winter for Photographic purposes.

To the Editor of the Photographic Journal.

SIR,—I have remarked during the last two months that the light has been almost valueless for photographic purposes; in fact, so bad, that I have never any previous winter noticed anything like it. With me, a picture has required an exposure three or four times longer than was necessary at the same period in other years. My purpose in writing is to endeavour to ascertain if the same want—or rather bad quality—of light has been experienced in other parts of the country, and if any cause can be assigned for the phenomenon?

H. P. R.

Courtrai. Provincial Art-exhibitions in France.—This little city has an Art-Union numbering 340 members. Having decided on an Art-exhibition, and counting on 200 or 300 pictures, 900 have arrived, many from Germany, as the environs of Courtrai are inhabited by rich and art-loving manufacturers, &c. [We may state here, in general, that all Art-exhibitions on the Continent are open to artists of the whole world.]

CORRESPONDENCE.

SIR,—Would you kindly inform me, in your Answers to Correspondents—1. If there is any satisfactory mode of strengthening a negative after it has been varnished? 2. How can faded photographs be revived? 3. The best means of avoiding the reflection from an albuminized print when copied by the camera?

By replying to these inquiries, you will greatly oblige

A CONSTANT READER.

1. We have never seen it successfully practised. 2. Many modes have been recommended, but, we believe, with very questionable success. A fading picture with yellow tints is in some instances arrested in its progress by immersion in a weak gold bath. 3. If the upper part of the print is made to lean a little forward, the reflection will be avoided; of course, then it is requisite to make the camera parallel with the object to be copied.

SIR,—Will the solar camera really enlarge a stereo *landscape* to any size desired, giving a pure photograph, that will not require finishing by an artist? I do not inquire respecting portraits, as I am aware it is done, but yet they require touching in many cases.

J. L. F.

If you procure a *good* negative, you will meet with very satisfactory results; we have seen some excellent pictures so produced.

A. Z. (*Brixton*).—We know of no better mode of vignetting than by the use of the glasses sold for that purpose: they vary much in quality; the one we have used appears to allow the light to pass through more than is desirable. The more evenness there is in the background of portraits generally, the more complete will be the success.

Subscriber (*Weymouth*).—Having devoted much time and attention to the manufacture of varnish, we strongly advise you to purchase it of those whose especial business it is to make it. Making varnish in small quantities is attended with much loss. The varnish of Messrs. Soehnée may be relied on; but there are many makers in London who sell a very good article.

S. B.—Your request shall be attended to.

A Tenor Vocalist kindly informs us of his perfect success with Woodward's solar camera, and that he can supply specimens of prints $22\frac{1}{2} \times 17\frac{1}{2}$ for 10s. each, or life-sized portraits vignetted for 15s.; he should patronize our advertising department, as we cannot insert his entire communication.

P. H. (*Clapham*) is thanked for his communication, which shall appear in our next.

ONWARD is in type, and will appear in our next.

Letters of inquiry to the Editor can be answered only through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 95. MARCH 15, 1860.

By the courtesy of the Council of King's College, the Photographic Society will in future have a local habitation at Somerset House. This new arrangement, on which we congratulate the Members of our Society, will be extremely advantageous to us in a pecuniary sense. It will also, we think, be to the advantage of our standing, and favourable to the increase of our publicity. Our first Monthly Meeting at Somerset House will be held on the 1st of May.

We may remind our readers that the Seventh Annual Exhibition of the Society will close on the 25th instant. Negotiations have taken place relative to the transfer of the entire collection to the Crystal Palace, for exhibition during the summer months: should such an arrangement be carried out, those gentlemen who have contributed their works to the Exhibition will be presented by the Directors of the Crystal Palace with a free admission for the season.

In a former Number some observations were made on the difficulties of reviewing our own Exhibition; yet, as it seemed requisite that some record should appear in our pages of the progress which has been made during the past year towards the perfection of our art, we have availed ourselves of some notes on this subject, which must be received as the expressions of an individual opinion, for which the Society is no more responsible than for those of any other of our Correspondents. As the merits of the Exhibition have been fully criticized in the leading journals of the day, and as the public have been made familiar with what has been done by us and our contributors, we need be in no great hurry with our own notes. In consequence of the pressure of other matter, we shall reserve the article until a future Number.

An invitation was formerly given to the

public to aid in our proposed Exhibition by the contribution of photographic apparatus. It was afterwards, however, found that the room in Pall Mall was not large enough for the accommodation of cameras with extended tripods, dark tents, and other bulky articles; that the exhibition of these large objects would endanger the safety of the property exhibited, as well as much inconvenience the visitors. Accordingly, some very excellent applications in aid of our art were transferred to the Society's Rooms, No. 1 New Coventry Street, where they may be inspected by all persons who may desire to see them. Mr. Ottewell has contributed four cameras of the most novel and useful make, which, for good workmanship and practical utility, must be inspected to be appreciated. Mr. Alfieri exhibits his improved developing camera, described in our present Number. Dr. H. G. Wright sends in "A Portable Photographic Apparatus for Field or Room," containing some most excellent and portable arrangements, and which, with some different mode to give greater strength to the supporting legs, will be a valuable acquisition to the practical photographer.

Mr. Sutton, of Jersey, has sent "A Portable Wheelbarrow Tent." This seems to be a very useful machine. It is sufficiently large, with its covering, to prepare and develope pictures of a full size; by the aid of its wheelbarrow form, when set up for operations, it may be easily removed to different localities in the same neighbourhood, without repacking it and its contents. The wheel is solidly constructed, and is very firm.

We are informed that the North London Crystal Palace at Muswell Hill is about to be commenced, and that those interested in its foundation and management have determined that Photography shall be well represented

and cared for in the new institution. A salaried officer, we are assured, will be appointed to especially superintend this popular department.

At the late *soirée* of the President of the Royal Society, and of Lord de Grey and Ripon, in Carlton Gardens, some very beautiful and novel applications of photography have been exhibited under the name of "Photo-zincography," being the production and invention of Colonel James, of the Ordnance Survey. Some specimens of reproduction of ancient documents were most interesting, and far surpassed anything which we have before seen. In a future Number we hope, by Colonel James's kindness, to furnish our readers with the details of the process.

Speaking of new modes of *permanent* reproductions by the aid of photography, reminds us of our unfulfilled promise to present with the Journal the print so kindly given us by Mr. Joubert, and which we had hoped to have given ere this time. The delay has arisen, not only from the long continuance of unfavourable weather, but also from a miscalculation which Mr. Joubert formed of his mechanical arrangements. Each print has to be exposed to the light; and the size of this print is just a trifle larger than is suited for his present apparatus for exposure to light. Every print, it is found, must be taken off separately, instead of, as Mr. Joubert had hoped, their being taken off in groups of four.

At the next Ordinary Meeting of the Society, which is fixed for April 3rd, it is proposed that a discussion shall take place on the Panoramic Lens exhibited by Mr. Sutton at our last Meeting, and which is described in the present Number of the Journal. The Secretary will be glad to receive any other communication on lenses, which may be discussed and considered on the same evening. Mr. Watson also promises, should time permit, a short communication "On the Means to be used to prevent the Discoloration of the Nitrate Bath for floating Albuminized Paper on it for the purpose of Positive Printing." Mr. Kilburn also consents, at an early Meeting, to exhibit and explain the Solar Camera of Mr. Woodward.

The printsellers caution photographers that they intend commencing law proceedings against all persons found copying, or selling photographic copies taken from, their copyright engravings; and they equally caution buyers, who are liable to law proceedings for possessing such copies. We have been requested to give this fact a prominent notice in this journal, that persons may not through ignorance incur the penalties of the law.

Mr. Kilburn replies to Mr. Hering in our advertizing columns in support of the allegations which he made at the Annual General Meeting, on the unfair treatment he considers he has received from Mr. Hering. It appears to us to be a proper question for the consideration of the managers of any future Exhibition to determine, whether any pictures other than those purely photographic ought to be admitted on the walls of the gallery.

The Liverpool Society of Fine Arts have determined to open an Exhibition of Photographs at Liverpool, as a section of the Historic Society of Lancashire and Cheshire, on the 2nd of April next; all inquiries respecting the proposed Exhibition should be addressed to J. A. Forrest, Esq., 58 Lime Street, Liverpool. The expenses of sending works for exhibition, we believe, will be defrayed by the promoters.

We have been favoured with a copy of the Rules of a New Photographic Society which has been formed during the last month, under the designation of "The City of Glasgow and West of Scotland Photographic Society," under the Presidency of Mr. Kibble, Mr. Camb being the Honorary Secretary. We give a brief report of the proceedings at the first Ordinary Meeting, and hope to report their success in our subsequent Numbers.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

PHOTOGRAPHIC SOCIETY OF LONDON.

Ordinary General Meeting.

Tuesday, March 6, 1860.

P. Le Neve Foster, Esq., M.A., Vice-President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The following gentlemen were elected Members of the Society:—

Egbert Moxham, Esq., Lyndon Smith, Esq., Frederick Gore, Esq., Stephen Thompson, Esq.

Dr. Becker, being about to leave England, was, in recognition of the services he has rendered to the Society, unanimously elected an Honorary Member.

The Chairman put it to the Meeting whether it would not be more convenient to reserve the discussion on the Report of the Collodion Committee until after the reading of a Paper which Mr. Hardwich had prepared on the manufacture of his collodion*, when it was determined that the discussion on the Report should be proceeded with at once.

Mr. Heath said that, as he had at the last Meeting moved the adjournment of the discussion on the Report, he felt that he might be permitted to commence it. He had no doubt he should thoroughly carry the feelings of the Meeting and of the Committee with him when he asserted that the gratitude of the Photographic Society was due to Mr. Hardwich for the valuable assistance and information he had afforded, not only to the Collodion Committee, but to the Society at all times. Mr. Hardwich had unreservedly laid before Mr. Malone his formula; and his experience and time had been at the command of every Member of the Committee. He was anxious to make that acknowledgment, because he felt it necessary to take exception to the Report. In saying this, he desired to be clearly understood as not in the least questioning the high character of Mr. Hardwich's collodion—in point of fact, he was prepared to make the admission that it merited the very highest character; but he nevertheless seriously doubted whether it were wise, just, or equitable, that the Report should have been made at all. It would be remembered that at the Meeting of the Society last year, when it was announced that the Council had determined that a Collodion Committee should be appointed, it was stated from the Chair, in answer to an inquiry, that the Committee would be formed for the purpose of considering any collodions, or formulæ for making them, which individuals and manufacturers might desire to lay before them—not confining themselves to the one collodion of Mr. Hardwich, but taking a broader basis of operations. Now, turning to the first paragraph in the Report of the Committee, he found it stated that Mr. Hardwich, Mr. Mayall, and Mr. Sutton had sent collodion, but that the two latter gentlemen had not sent sufficient quantities to admit of its being thoroughly tested. Hence, although individual Members of the Committee had worked with the collodions of Mr. Mayall and Mr. Sutton, the Committee in its collective capacity could only pronounce upon that prepared for them by Mr. Hardwich. It appeared to him (Mr. Heath), if the Committee was formed for the purpose, so clearly and plainly defined by the Chairman, of testing the various formulæ sent in to them by the different manufacturers, that if that purpose could not be carried out, either by failure in sending in formulæ or otherwise, the existence of that Committee was at an end—it practically was defunct. A Committee had been formed at Manchester for testing the various dry and preservative processes, a Printing Committee had been formed by this Society here, and very lately the Scotch Society had had a Committee for testing lenses. Now, supposing each of these matters had been the secret of an individual, would those Committees, if only one process or one lens had come before them, have been justified in publishing a Report? Would it not have been manifestly unfair and unjust towards others? And yet that is what has been done by the Collodion Committee. The stamp of the approbation of the Society was a thing most desirable to be obtained—it was an honour and a privilege dearly to be coveted; but he held that a scientific Society should well weigh the full consequences of affixing its seal of approbation to anything that might come before it. He had no hesitation in saying that, in consequence of the publication of this Report, Mr. Hardwich's collodion would rank in the estimation of the public as superior to that of any other manufacturer. Now, was the Society prepared to take upon itself the perpetration of an act of such manifest injustice? If so, there would not be a single maker of collodion without just cause of complaint. He spoke from an experience based upon the opinions of a large number of people, and he felt justified in saying that there were many collodions which could compete successfully with that of Mr. Hardwich. He (Mr. Heath) desired most emphatically to observe, that in dealing with this question the Meeting must bear in mind that Mr. Hardwich's collodion was a commercial article, that it was made for sale, just as much as that of Mr. Thomas or any other maker. And it was that commercial element which they must bear in mind when he asked the Meeting, in the interest of all makers of collodion, not to give a preference to Mr. Hardwich's collodion because other makers had not thought it consistent with their interests to come forward and submit their collodions to the testing of the Committee. He had seen with regret that, in a foot note at the end of the report of the proceedings of the last Meeting in the Society's Journal, Members were referred to an advertisement from Mr. Hardwich, that he intended to discontinue manufacturing his collodion for sale. Now he (Mr. Heath) did not feel the necessity for that gentleman withdrawing from the manufacture of his collodion simply because it might be said that his collodion was a commercial article. Let Mr. Hardwich's collodion compete on fair grounds with other makers' collodion, and no one would have any right to complain. It might be a bold assertion to make; but he (Mr. Heath) would say that, when certain Members of the Society who formed a Committee came forward with a Report which gave a certain preference to Mr. Hardwich's collodion, he (Mr. Heath), as a Member of the Society, had a perfect right to come forward and say, from his experience, that there were other makers whose collodions were superior. He scarcely thought it right to make use of the Society for the purpose of mentioning any particular names; but he thought he might venture to state his own experience with the collodion of one maker during last summer, because he thought that, if a report like that of the Collodion Committee were to be made and adopted in the transactions of the Society, the reports of himself and others should take their places by the side of it. He (Mr. Heath), from his business engagements, had but little opportunity to practise photography; but some time in the February of last year he

* See below, p. 173.

procured 20 ounces of collodion of a particular maker, and between February and November he had taken perhaps a dozen pictures, and he thought he could show negatives taken within that time which would be deemed perfectly satisfactory. Whether he worked in March or in November, the exposure given to the plate, making of course an allowance for the difference of light, was as nearly alike as possible. He mentioned that for the purpose of expressing his opinion that a collodion of that nature must be far more serviceable and valuable in the hands of all, and especially in the hands of amateurs who only worked occasionally, than a collodion which so speedily lost its sensibility. He must ask the Meeting to bear in mind that fact when they were legislating upon the question: and he thought he was right in using the word "legislating;" for decisions come to in that room were rules for the guidance of those who were not present. If, therefore, the Society said that a collodion of a particular maker was of "superior excellence" (and those were the words used in the Report), he thought they would be unfairly committing those absent. He regretted to notice that only two-thirds of the names of the gentlemen forming the Committee were attached to the Report. He had the greatest respect for the names of those who had signed it; nevertheless he should have attached greater weight to the Report if the names of the other Members of the Committee had been there also; and he was probably somewhat influenced in his opinion by knowing that one gentleman on the Committee, whose name was not appended to the Report, agreed with him entirely in the opinion he (Mr. Heath) had expressed that evening with regard to the value of the collodion he had just referred to. He did not mention his name; for he had not sought permission to do so, feeling assured that the Meeting would credit his statement, that the gentleman alluded to was a highly respected and a most careful and painstaking manipulator. In conclusion, he (Mr. Heath) thought that, if the Committee had looked at the matter in its commercial aspect, they would have hesitated before presenting a Report upon one collodion only, seeing that the object for which the Committee was formed was the investigation of a number of collodions. With regard to Mr. Hardwich himself, he (Mr. Heath) trusted that gentleman would see that the few remarks he had made were founded upon sound and logical reasoning; and at all events, if he failed in convincing him upon those grounds, he begged to assure him that the necessity he had felt for making the foregoing observations did not in the least diminish the very high estimation in which he held Mr. Hardwich for the great services he had rendered to photography.

Mr. Sebastian Davis thought there were very sound reasons why the Report should have been made upon Mr. Hardwich's Collodion. It would be in the recollection of the members that no collodion was to be examined, and no report was to be made, unless the collodion was accompanied with a full and detailed account of the formula for making it; and on the face of the Report it appeared that no one but Mr. Hardwich had complied with those conditions. Other gentlemen were at liberty to have come forward; but for some reasons or other they had not done so. One collodion only was placed in the hands of the Committee; and he thought, in common justice to the gentleman who had sent it in, and fully complied with all the conditions, the Committee were bound to examine and report upon it. They were met that evening for scientific purposes; and it was upon scientific principles that the question should be discussed. He thought they were called upon that evening to consider the collodion itself, its manufacture and its properties. Looking to what was stated in the Report, he was inclined to think that the collodion reported on might, without dispute, be considered to be very good, if not the best, for its adhesion to the glass, the easy way in which it flowed over it, the readiness with which it flowed over a large-size plate, and for the other qualities named. He had tested some which Mr. Hardwich had been kind enough to forward to him. He thought, too, that they had gained a great step in advance in having obtained a formula by which they could secure that great desideratum—a uniformity in manufacture. With reference to the use of iodide of potassium in iodizing collodion, he thought that iodide of potassium alone was not the best salt for the purpose. The reason, he thought, was plain: iodide of potassium in solution was more liable to decompose the ether and alcohol in collodion than any other of the salts in use, except iodide of ammonium. Iodide of potassium had, generally speaking, when in a pure condition, an alkaline reaction; and if ether were added to it, it would be found that decomposition would take place without the addition of the pyroxyline. If, on the other hand, other salts were used which were not so liable to decomposition, an iodizing solution might be obtained which, mixed with equal portions of ether and alcohol, would remain colourless for any length of time, and uninjured as regarded its other qualities. He did not think that the iodide of potassium alone did produce a sensibility equal to that obtained from other salts. He thought, however, that the Committee had made two or three anomalous statements. In one part it was asserted that the collodion in sensibility was unsurpassed, and that Mr. Frith, at a temperature of 130°, was enabled to take moveable figures with it. The meeting should, however, remember a remark made by that gentleman at one of their meetings, referring to collodion of his own manufacture, that the only difficulty he had to contend with was, its being too sensitive, and that he had to counteract that by adding acid to his bath. With regard to portraits, which were usually taken in a medium light, it would be found that the evidence before the Committee was contradictory. Mr. Delamotte said he had found Mr. Hardwich's collodion very sensitive; again, Mr. Williams and Mr. Morgan, and some other gentleman on the Committee, stated that in portraiture they did not find it so sensitive, and it was remarked that this might partially be accounted for by Mr. Morgan's using citric acid in his developer. He thought that was scarcely a decisive test. A collodion to be tested against another collodion must be tested under precisely the same circumstances. He had not brought forward these facts in opposition to Mr. Hardwich's collodion. No one had a greater respect for that gentleman than he (Mr. Davis) had; and the Society and the photographic art were indebted to him for his formula freely given to the world. He trusted that the Committee, which was still in existence, might continue its valuable researches.

Mr. Delamotte said he should like to correct the last speaker. He thought that the Report which he (Mr. Delamotte) had sent in was not quite fairly quoted by Mr. Davis. In the Report, he stated that he wished, if possible, that the collodion might remain sensitive for a longer time than he found to be the case. He did not complain of the sensitiveness of the collodion when he first used it, but of its not retaining its sensitive properties after being iodised.

Mr. Sebastian Davis said he referred to the sensitiveness of the collodion after it had been mixed, say three weeks in the summer. His own conviction was, that a collodion might be made as sensitive with the addition of some other iodising salt.

Mr. Watson was happy to find that Mr. Davis had now come to a more thorough knowledge of Mr. Hardwich's formula than formerly, because when the rec-

lution for the appointment of the Committee was come to, he found, on reference to the 'Journal,' that Mr. Davis had then stated that he was not able to produce a satisfactory collodion by following the formula given in the last edition of Mr. Hardwich's book. It would appear that Mr. Davis had now no difficulty; that gentleman, therefore, must either have come to a better understanding of the formula, or have had further information; and it was desirable that that should be clearly explained. Mr. Davis was not singular in being unable to produce a collodion from the formula which was sent in. He had heard others state that they had tried it, and failed. He had heard one gentleman, who was second to none in London as a practical chemist, say that he could not make collodion by the formula given by Mr. Hardwich in his book. It did not appear that the Committee had examined any formula sent in. There was no account of such examination.

The Chairman would call the speaker's attention to the last paragraph but one of the Report, in which it was distinctly stated that such an examination had been made.

Mr. Watson said, with respect to the latter part of the Report, the Committee stated that the collodion which they had examined was superior; but they did not say to what it was superior,—as it was impossible they should, seeing that they had examined only one; and superior was a comparative word—scarcely, he thought, a proper word to use. If they had examined the other samples,—if they had made collodion from the other two formulæ sent in,—they might then with propriety perhaps have stated that the collodion they had examined was superior to the others.

Mr. Mobley said it really appeared to him that the meeting would be in a better condition to discuss the formulæ and the manufacture of the collodion if they had before them the paper which Mr. Hardwich was prepared to read to them that evening. They were not in possession of the whole subject. He therefore moved that Mr. Hardwich's paper be then read.

Mr. White seconded the motion, which was duly put and carried.

The Chairman then called upon Mr. Hardwich to read his paper.

Mr. Hardwich then read the following:—

On the Manufacture of Photographic Collodion.

The manufacture of photographic collodion could not be described in a paper of the ordinary length, without omitting many important points, and treating others in a superficial manner. I am therefore compelled to make a demand upon your patience, but will do all that lies in my power to assist the comprehension of the subject, by dividing it into separate portions. To commence, then, with the chemicals which are used in the manufacture of collodion.

1. *The Cotton.*—For some time after I begun this process, I purchased cotton of Messrs. Hutton & Co., of No. 6 Newgate Street, City, without knowing anything of its manufacture, excepting that it was the finest quality procurable, and cost two shillings per pound. Afterwards, however, I thought it better to procure a variety of samples of cotton wool of different growths, which I was enabled to do by the assistance of a friend, who sent me some fourteen or fifteen packets, grown in America, Madras, South Sea Islands, &c., and ranging in price from fourpence halfpenny to fourteen pence per pound. Having prepared the nitrosulphuric acid in the manner presently to be indicated, and found by trying it with the ordinary cotton that it was of the correct strength, I divided it out into equal measures, and immersed about nine or ten of the most characteristic of the cottons. The result was a failure in every case, the material being in a great measure dissolved by the acid. None of these cottons had undergone any cleansing, and therefore, although many of them appeared sufficiently white and pure, it appeared desirable to try the effect of boiling in a weak alkaline ley. The process proved more successful than I anticipated, and enabled me to prepare pyroxyline from a sample of cotton which was otherwise immediately disintegrated and reduced to pulp by the action of the acid. Evidently the cotton fibre is encased by a film of some resin, which the alkali converts into a soap, and removes in a soluble form. Supposing this resin to be left upon the cotton, it resists for a little time the action of the nitrosulphuric acid, and much squeezing with the glass rods is required to wet the cotton and make it imbibe the fluid: bubbles of air are entangled at first, and cannot easily be expelled, but almost immediately afterwards an evolution of red fumes takes place, and the fibre is destroyed by oxidation. On the other hand, with the cotton which has been previously treated with dilute potash, there is no difficulty whatever in making it absorb the acid; it sucks up the liquid like a sponge, and remains nearly unaltered in appearance during the whole time of the digestion.

I cannot say that I have invariably pursued the plan of cleansing the commercial cotton wool by boiling in a weak alkali, since I was not at first aware of the importance of so doing. When, however, I observed the effect of the potash upon the raw material, I at once applied it to the commercial cotton, and with manifest advantage, for I now obtain at least fifteen per cent. more in weight of pyroxyline, and secure greater uniformity in every other respect. Even from the finest qualities of the wool, traces of soluble matter are extracted by potash, sufficient to impart a strong yellow colour to the alkaline liquid, and which, if permitted to remain, would deoxidize that portion of the nitric acid immediately in contact with the fibre, and so far weaken it as to ensure the immediate solution of a part of the cotton.

It is always desirable to simplify a chemical process, when it can be done with impunity,

but at present I am disposed to recommend this alkaline treatment of the cotton, since in purchasing the finest qualities previously, in quantities of twelve pounds at a time, I did not find them to correspond, which I now think may have been due to the greater or less perfection of the cleansing process; and without doubt the percentage gain in weight, on converting the cotton into pyroxyline, has been greater and more uniform since the preliminary treatment with a dilute alkali was adopted.

The cotton which I use is of American growth, but not always from the same State, since it appears that the manufacturer is guided, in making his purchases, by the varying price of the market. This cotton is sent out in packets of one pound each, which I divide into quarters, and boil each quarter gently for two hours, in a solution of two ounces of potash (at 2*s*. 6*d*. per pound) to a gallon of water. The mass is then lifted out, and well squeezed with repeated changes of water for about twenty minutes, after which it is spread out to dry. The assistant to whom this preliminary part of the process is entrusted, receives full directions to remove the whole of the potash, and to disturb the fibre of the cotton as little as possible, since if it become knotted and twisted, the action of the nitric acid will be interfered with.

It may perhaps be suggested that the potash is likely to exercise a chemical or modifying action on the fibre of the cotton, but I do not think that it has any such effect when used in dilute solution, and for a comparatively short time, as I advise. I formerly believed that a prolonged digestion in a somewhat stronger potash might by degrees affect the cellulose, and produce more or less of that condition which we see in old and rotten calico, as compared with the new material; but there need be no apprehension of this in the process above described, because cotton fabrics which have been weakened by wear and repeated washings become more easily soluble in nitrosulphuric acid, whereas the cotton wool, by boiling in weak alkali, is rendered less soluble in the acids. I think it right, however, to mention that the use of the potash is a recent improvement, none of the collodion tested by the Committee having been prepared from cotton so treated.

2. *The Sulphuric Acid.*—I have not derived any advantage from using the pure sulphuric acid, but have found the commercial acid sufficiently good for the purpose. The strength is a little variable, and therefore it is better to take the specific gravity of several samples, and to select the strongest. Sulphate of lead and bisulphate of potash are mentioned as impurities of commercial oil of vitriol; but I never detect the latter in any samples which are sent to me, and very seldom the former; from which I infer that the great and increasing demand for oil of vitriol in the arts has led to a gradual improvement in its manufacture. Traces of nitric acid are usually present in the commercial acid, but not to an extent likely to interfere with the preparation of pyroxyline.

3. *The Nitric Acid.*—I have been asked why I recommend so strong a nitric acid as that of sp. gr. 1·45, seeing that the acid is afterwards to be so greatly diluted with water. There are two reasons for so doing: first, because this acid is cheaper after the rate, and perhaps more uniform, than a weaker acid; and secondly, it is important that both the sulphuric and nitric acid should be as strong as possible, in order to allow of the use of sufficient water to raise the temperature on mixing at once to the proper point, and so to obviate the necessity of employing artificial heat.

A saving of expense is effected by using the yellow acid, sold in commerce as "Acid Nitros," in place of the pure acid of equal strength; and for some time I was of opinion that this might be done with impunity: it subsequently appeared, however, that the quantity of chlorine in the "nitros acid" is more variable than I imagined; and on inquiry I find that it must necessarily remain so, inasmuch as the cargoes of nitrate of soda, from which the acid is made, differ in quality, and no preliminary process of purification is resorted to, with a view of eliminating the chloride. The effect of chlorine, when present in the nitric acid in more than a certain proportion, is to decompose the pyroxyline and cause its partial solution in the nitrosulphuric acid. Hence it becomes necessary to work with a smaller quantity of water, and consequently an inferior pyroxyline is obtained, as I shall presently show. The chlorine also slightly modifies the composition of the pyroxyline in some unexplained manner, causing it to give more intensity in the photographic process, and lessening its keeping properties in collodion both before and after iodizing. The pure acid answers perfectly; but I do not usually employ it alone, from motives of economy. The plan which I have followed has been to apply to the manufacturer, and ask him to pick out for me a carboy of the purest "nitros acid" in stock; this I test with nitrate of silver, and compare it with a standard kept for the purpose; if the chlorine exceeds a certain quantity, two carboys, one of pure nitric acid, and the other of acid

nitros, are mixed in equal bulks. To give a notion of what the standard is, I may mention that if one drachm of nitrate of silver, dissolved in half an ounce of water, will throw down the whole of the chlorine contained in half a gallon of the acid, the sample is sufficiently pure.

Besides chlorine, the "nitros acid" contains peroxide of nitrogen, imparting to it a yellow colour; but this, I think, enters into a fresh combination on the addition of the oil of vitriol, and produces no effect upon the immersed cotton.

4. *The Ether.*—Next to the pyroxyline, the ether is the chemical of most importance in making collodion; and I have always in this process felt myself to be at the mercy of the ether manufacturer. Indeed, the purity of the ether is of more consequence with pyroxyline of the kind which I recommend than with some other varieties of that substance; and I think that the success of the present attempt to give a definite formula for collodion will depend very much upon whether the makers of ether can supply a uniform article in the desired quantity. What we need is an ether which, when mixed with an equal bulk of strong alcohol containing iodide of potassium in the proportion of 3½ grains to each ounce of the mixture, will remain colourless for several days in the cold season of the year. Commercial ether usually strikes a yellow colour in less than half an hour when treated as above described; but in that case it cannot be termed pure. It is quite possible to prepare ether which will stand the test just mentioned, by proceeding in the following manner:—Take the best washed ether of commerce, and agitate it thoroughly with a small portion of dilute sulphuric acid, then introduce it into a retort, and distil over one-third of the total bulk. It first occurred to me to employ the sulphuric acid, from having noticed that ether which liberates iodine from iodide of potassium, often possesses an alkaline reaction to reddened litmus; and since the last distillation which ether undergoes in being purified is from a caustic alkali, I thought it possible that small portions of some volatile organic body of a basic kind, might be carried over with the ether. Whether this be so or not, I am assured, beyond a doubt, that the quality of the ether is materially improved by this final distillation from diluted sulphuric acid; and therefore the additional cost, which cannot exceed sixpence per pound, must not be considered*. The reaction of the pure ether is still alkaline to reddened litmus, thus showing that the whole of the acid remains in the retort: specific gravity ·722 to ·725 at 60°. At present I am not able to assert that the ether which I obtain is invariably constant in properties; so that there is room for further improvement, although when we compare ether of the present day with that which was sold in commerce a few years ago, the advance is very evident.

In connexion with this subject of ether, I would add two or three more remarks. It is possible to make any ether stand the test of iodide of potassium most perfectly, by agitating it with a little dry carbonate of potash; but the resulting collodion is, in fact, injured rather than improved by such a process, since the carbonated alkali decomposes the guncotton. When, however, we obtain a sample of ether which has been distilled from sulphuric acid, and yet find it to remain colourless for a long time on adding iodide of potassium, we may be assured of its perfect freedom from the "ozonized" principle*.

The difference between bad and good ether is seen most evidently after long keeping. Supposing light to be excluded, a pure sample of ether may be placed in a bottle, only half full, and at the expiration of two or three months it will scarcely become coloured on the first addition of iodide of potassium. Ether only partially purified will often stand the test of iodide of potassium when freshly distilled, but it will soon acquire the property of liberating iodine when it is stowed away for keeping. Supposing, for instance, that traces of *aldehyde* be present (which is not an improbable notion), this aldehyde would gradually absorb oxygen, and the ether would deteriorate. We must bear in mind that all varieties of pyroxyline have more or less tendency to ozonize ether by degrees, although some are more stable, and consequently superior to others in this respect. Hence, with the best quality of ether, the collodion will not stand the action of iodide of potassium so well as the solvents minus the pyroxyline; but when we have to deal with an inferior ether containing traces of some more oxidizable body, then the peroxide of nitrogen in the guncotton will soon act upon this substance, and the collodion will not bear very long keeping without acquiring the property of becoming immediately yellow on adding the iodizer. To show that this difficulty, although requiring further investigation, is likely to be eventually

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Hythe, 12th February, 1860.

GENTLEMEN,—The Council of the Photographic Society of Scotland having done me the honour of requesting me to act as judge in awarding the Society's medals and the Maconochie Wellwood Prize, I accepted that very responsible office in obedience to their wishes. I at the same time felt that, however anxious I might be to discharge the duty with every degree of attention and impartiality, I could not hope to give satisfaction to all the Members of our Society.

I directed my attention, in the first place, to the landscapes; and here, from the vast number of admirable pictures in the Exhibition, I found great difficulty in coming to a decision. I devoted four days to the examination of the landscapes, seeing them by day-light and by gas-light. I commenced by putting down all the pictures that, in my opinion, had a fair chance in the competition; and such was the excellence of the Exhibition in this department of our glorious art, that I found no fewer than fifty-eight pictures, all of first-class merit. I regretted that I could not award a medal to every one of them; but as I had only one medal at my disposal, I went over and over the list, gradually and carefully striking out those that were inferior; at last the race lay between Mr. Mudd's No. 627, Mr. Maxwell Lyte's No. 623, and Mr. Dixon Piper's No. 68. These are pictures of such excellence, so perfect in every point where an artistic photographer looks for beauty and scientific manipulation, that I more than ever regretted that I could only award one prize. Finally, after looking at them hundreds and hundreds of times, I decided in favour of Mr. Mudd's picture, No. 627, "Waterfall near Coniston." Not that it was superior in either beauty or manipulation to the other two: but in the view selected there were fine gradations of distance; and while the foreground was perfect in focus, the hills in the background, in their various degrees of distance, were admirably brought out. I have no doubt that, if Mr. Lyte or Mr. Piper had selected an equally difficult landscape, their pictures would have been equally good.

Having made up my mind as to the award of the medal for the best landscape, I directed my attention to the portraits and groups. Here I had less difficulty. I could not find more than twenty pictures that had any claims to consideration; and after repeated and careful examination I decided in favour of Mr. Robinson's picture, No. 470, entitled "Here they come!"

I hope my award as to this medal will meet with general approbation, as I have never wavered in my opinion as to Mr. Robinson's picture ("Here they come!") being the best of its class in the Exhibition.

Having disposed of the medals, I turned my attention to the prize of £10, so generously given by Mr. Maconochie Wellwood, to be competed for by Professional Members of our Society; and after carefully examining all the pictures that were entitled to compete for this prize, I decided in favour of Mr. Rodger's picture (No. 87), "Master and Miss Gordon." The only difficulty I experienced was in making up my mind as to which of Mr. Rodger's pictures was best entitled to the prize.

I beg to apologize for not attending your meeting on the 14th instant, and from the Chair announcing my award. I am, however, at *school*, hoping to gain information that may afterwards be useful to my countrymen, and I cannot get away.

I cannot conclude without congratulating the Society on the excellence of this year's Exhibition. Every year we see a marked improvement in the pictures sent for exhibition; and we have also the satisfaction of knowing that no Society is doing more than the Photographic Society of Scotland to foster our fascinating art.

HORATIO ROSS, V.P.

To the Photographic Society of Scotland.

On the conclusion of the Report, the Chairman presented the Maconochie Wellwood Prize to Mr. Rodger, who afterwards returned thanks. Mr. Robinson and Mr. Mudd being unable to attend the present or the next Meeting, the Society's Medals have been sent to them.

On the conclusion of the business connected with the prizes, the following paper was read:—

On the Collodio-Albumen Process.

By Mr. JAMES MUDD.

I AM sorry that my engagements elsewhere prevent me from being present at your Meeting on the 14th inst. It would have given me much pleasure to have acknowledged in person the honour you have done me in awarding one of the silver medals for my photograph of "Coniston Falls." I am much gratified, I assure you, that it has been my good fortune to have gained this distinction; and, believe me, the interest I have always felt in your Society will be increased by this pleasant circumstance. The fact that the prize picture is taken by a dry process, and has successfully competed with those by wet collodion, is as much the source of my gratification as anything of a more personal nature. I have

maintained repeatedly my opinion that the productions of the former are quite equal, and frequently superior to the latter for landscape photography, and I look upon the decision you have come to as a triumph for the dry processes. "Soot and whitewash" and many other forcible terms have been frequently employed in describing their results; but I think it is becoming every day more evident that beautiful definition, softness and delicacy of half-tone, and all other qualities which are desirable in a photograph, are *not* monopolized by wet collodion alone. But I will not argue this much-"vexed question." Pictures by both processes are side by side in our Exhibition-rooms; these are the arguments which will best decide the question.

That the dry processes are more convenient to the wandering photographer in search of the picturesque, I think will not be denied. The absence of "tent" or "van" duties during a tour, leaves it a much more enjoyable occupation. I have tried both processes. I remember, some years ago, after a hard day's work at wet collodion, I registered a solemn vow that if I could not "do" photography a little easier I would give it up altogether. I then took to the waxed-paper, and when the Taupenot or collodio-albumen process came out, adopted that. I have never been turned aside from the study of this process by the many inviting discoveries which have continually presented themselves, but, convinced that I had adopted a standard process to work out, I have since given it my entire attention.

Before I proceed to give you a brief account of the process, I will illustrate the remark I have just made, as to the comparative comfort and convenience of dry *versus* wet collodion, by a description of a day's work with my camera in Wales,—one of the many pleasant trips which the use of dry plates has enabled me to enjoy.

I had an invitation to spend a few days with some friends amongst the fine scenery of that locality, and, not liking to be idle, put up my camera and a dozen plates, intending to use them if convenient, but not to allow photography to interfere with the pleasures or plans of my companions—two ladies and two gentlemen, who were *not* photographers. Every morning we took a conveyance for a drive; and, "by desire," my camera always accompanied us. On the morning to which I refer, the weather was glorious, and there was that stillness of atmosphere so favourable to photography. As we drove slowly on, there was ample time to look out for subjects suitable for the camera. In this occupation my companions joined heartily, declaring it to be quite a "new sensation." The ladies especially were positively enthusiastic, and discovered the "sweetest little peeps" every few minutes.

When I did stop to take a view, the delay was quite acceptable to my friends, as it allowed time for a little botanizing, a ramble by the river, or a cool lounge in the carriage, which, drawn up under the deep shade of the nearest roadside tree, afforded a most agreeable shelter from the heat of a July sun. In this way we journeyed on; and I took several views, which were exhibited in your Exhibition of 1858–59.

About noon we entered a beautiful valley, through which ran a mountain stream. To my surprise, in this lonely spot, I espied, upon a rocky mound overlooking the river, the familiar "three legs" of a camera-stand surmounted by a stereoscopic camera. On coming nearer, I found drawn up on the roadside a large photographic van, bearing in outward appearance a close resemblance to that kind of itinerant habitation in which giants, dwarfs, boa-constrictors, and pig-faced ladies generally reside. Two horses, released from the shafts, but retaining their harness, were cropping, at a short distance, the grass that the neighbourhood afforded; while a man, who was evidently there as groom, driver, assistant photographer, and, as the advertisements say, "to make himself generally useful," was toiling up from the river with a pail of water. Over the roof of the van were hung large cloths dripping with water, the contents of previous buckets. This, I judged, was done to cool the atmosphere within. Just visible in the doorway of the vehicle stood a tall individual, thoughtfully polishing a plate of glass. I approached and saluted this gentleman, who kindly asked me to "walk up." These words, as I ascended the few steps that led to the interior, were so associated in my mind with "be in time, positively just going to begin!" that I mentally repeated them; and for a moment my hand wandered instinctively to the region of my cash-pocket.

I found the occupier of the van an amateur photographer, who was out for amusement and the benefit of his health. With that friendliness which the brethren always display towards each other, we were soon chatting comfortably together. Of course I spoke of the process I was using; and, as I looked round upon the extent of his baggage and preparations, I could not help contrasting the smallness of my equipment with the numerous and weighty articles of his. He was very sceptical respecting the capabilities of dry plates; and when I told him I had taken three pictures that morning, asked me if I was "*sure I had them.*" I replied that I had no uneasiness on

that score, as the plates I knew were good, were exposed under favourable circumstances, and therefore could be successfully developed. He still shook his head, and "didn't believe in the dry process." "You see," he said, "I always like to know what I have got."

Well, we drove on up the valley, took some more views, lunched at a small inn, wandered over the ruins of a castle, and turned our horses' heads homewards by the same route we had made in the morning. It was evening as we approached the spot where we had met our friend the photographer. To my surprise, there was the camera with its slim legs clearly defined against the evening sky, in exactly the same position, and pointing precisely at the same object as it did in the morning! I descended from the carriage, and found our photographer and assistant just cleaning up for the day. Their looks were melancholy; and to my question of "what luck?" I was informed by my "brother" that he had tried all day to take *that* view and had not yet succeeded. He had been badly treated, he said, by his bath, which had behaved in the most disgraceful manner—he supposed, in consequence of the heat of the weather. It was annoying, he added, but unusual—quite unusual. He turned his back for a moment; and his assistant, taking advantage of that movement, whispered to me, "Oh! its *always* a-doing of it, Sir! I do believe gov'nor would have drowned hisself in it before this, if it had bin big enough, he's bin so awful aggerawated by it."

The principal portion of the day, it was confessed, had been spent in doctoring and filtering this refractory fluid. I bade our friend good bye, and, laughingly referring to his words at parting in the morning, asked him if he found any difficulty in ascertaining "*what he had got*" during the day! He looked grim, and defiantly repeated that he "did n't believe in the dry," but added, somewhat more quietly, "he wished he could."

What became of him and his companion that night—they were miles away from any human habitation—I know not. Whether they drove their lumbering van by moonlight to the next village, or retired within the chemically-scented interior to pass the night, I cannot tell, for I met them no more. This I am pretty sure about: that if our wandering photographer found *amusement* in all this, he certainly would not find it *benefit his health*!

And now I will proceed to describe the process I used on this occasion, and which I still continue to use at the present time. I have, I feel, nothing very novel to tell. The process is in reality identical with the original Taupenot process described at least two or three years ago.

The first thing to do is to clean the plate. There are various methods of doing this—I use tripoli and spirits of wine; but I need not stay to describe this operation, which all must know how to perform. Coat the cleaned plate with collodion in the usual way. After allowing the film to "set" well, sensitize in the ordinary nitrate of silver bath: the collodion for this purpose should not be too thick. If it is found to give a very creamy film, it should be reduced by adding pure ether. This and the sufficiently "setting" of the film are both precautions to avoid blisters in subsequent operations. Having sensitized, wash well under a stream of running water, both the back and front of the plate. It is not necessary to use distilled water for this purpose. This washing removes the greater portion of the free nitrate from the surface; what little there is left is converted into iodide of silver by the iodized albumen, which has now to be poured over the washed collodion surface. The iodized albumen is made as follows:—

To the whites of ten eggs add
50 grs. iodide of potassium,
10 grs. bromide of potassium,
100 minims liquid ammonia,
$2\frac{1}{2}$ ozs. water.

Dissolve the iodide and bromide in the water, then add the ammonia. Mix altogether with the albumen, and beat the whole into a froth. Let it settle; and then it is fit for use.

While the plate is still wet from the washing, and after it has drained a moment or two, pour over its surface the albumen, *twice*. You may use the same albumen for two or three plates; but after that it becomes too limpid, by mixing with the water on the plates, to use again, and it is better to take a fresh quantity. Now allow the plate to drain on one corner five or ten minutes; then dry it rapidly before a clear bright fire, and make it quite hot. This is another means of preventing blisters. I have proved repeatedly that the subjecting of films to considerable heat has a wonderful effect in ensuring their adhesion to the glass.

The plate in its present state is not sensitive to light, and will "keep" for years. I have never known them to deteriorate in the slightest degree, and have used them frequently twelve months old. This keeping-quality is very convenient, as it enables the photographer to prepare, during the winter months, a stock of plates for the summer season. To make a plate sensitive, it is only necessary to dip it for one minute into an aceto-nitrate bath:—

40 grs. nitrate of silver,
½ drachm glacial acetic acid,
1 oz. water.

Before immersing, however, warm the plate at the fire, or in any convenient way. After taking it out of the bath, drain a moment, and then wash profusely under a stream of water. No amount of washing, however great, seems to lessen the sensitiveness. A plate well washed always keeps longer, and developes cleaner, than one washed insufficiently. After washing, drain, and place on blotting-paper to dry. The plate may be dried artificially, but will dry spontaneously in about ten minutes.

We come now to the question, how long will this plate, which is ready for the camera-slide, retain its good qualities—how long will it "keep"? This is just the one weak point in this process when compared with some others—the gelatine, for example. In hot weather there is a tendency to turn red all over, under development, if the plate is kept sensitized more than a fortnight. In the cooler weather of spring or autumn the plates will remain good six weeks or two months. Within the last few days I have seen some excellent negatives taken on plates prepared at my establishment on the 10th of last August, and developed five months after exposure. In cases, however, where plates are required to be kept for a lengthened period, it is safest to carry them unsensitized, and have the aceto-bath with you in order to make them sensitive as they are required. I have never done this myself, however, my trips never exceeding two or three weeks.

And now as regards sensitiveness and exposure. Compared with wet collodion, these plates are at least five or six times less sensitive. It is difficult to give in figures a correct idea of the time. One or two trials will soon decide this better than anything I can say. It may be some guide, however, to compare it with other dry processes, such as the Fothergill, honey, gelatine, and others. It is quicker than any of those I have named, and certainly stands next to wet collodion in sensitiveness.

The development of the latent image is the most important operation in this process. It is slow, but on that account very manageable. If the plate is well exposed and free from blisters, there is no doubt of getting a picture. There are two methods of development—with pyrogallic acid on a stand, and with gallic acid in a dish. I will describe both. To develope with pyrogallic acid: Take the exposed plate and place it on a levelling stand: I use one with a round top. Pass a little water over the surface; then take a sufficient quantity of developing solution—

2 grs. pyrogallic acid;
½ drachm glacial acetic acid,
1 oz. water,

and pour it over the plate repeatedly. When the sky and high lights appear, add a few drops of a 10-grain solution of nitrate of silver. This will bring out all the details of the picture as you look down upon its surface; but when held up to the light it will appear weak and transparent. In this state add more silver until you gain sufficient intensity.

During the development it is more than probable that the surface may be marked by streaks or stains; or a deposit may cover the whole plate. If this should occur, stop the development, wash with water, and with a piece of fine cotton-wool rub away these defects, and go on again with the development. The horny surface of the albumen covering enables you to do this without fear of damaging the negative. This is the great advantage the process has over every other. The Fothergill, gelatine, and other processes will not bear long development. If it is prolonged, a deposit falls, and the softness of the film does not allow it to be removed. The collodio-albumen plate can be developed for hours or days, because, though the deposit falls, it can be wiped off again and again. This is an immense advantage when the picture is under-exposed, as it can be frequently brought out by long development. The other dry processes must have the right exposure, or they are lost.

To know when a negative is sufficiently developed is a nice point; and it is very easy to be deceived in the comparative darkness of the operating room. A negative always looks a great deal more intense in the room than it does when brought to the light. This must be allowed for. It is an excellent plan to have a good negative in the room with you, in order to compare with the one you are producing. Do not judge of the merits of your picture by the blackness of the sky, but by the details of the picture itself. A really good negative will rarely have a dense sky. I have heard people exclaim with the greatest satisfaction, "Yes, I developed it, Sir, till the sky was as black as my hat!" This was to impress me with the perfect character of the picture referred to.

To develope with gallic acid: Take the exposed plate and put it face upwards into a glass or other dish, with a sufficient quantity of a saturated solution of gallic acid to cover it. When it has remained five or ten minutes, add a few drops of 10-grain silver solution, and mix well in the dish: the picture will gradually appear. When all the details are out, add more silver till the development is complete. This is a slower method than the

other; but several dishes, each containing a plate, may be attended to at the same time.

Fix in hyposulphite of soda, about six ounces to the pint of water. Cyanide of potassium must not be used for this purpose.

I have now described the process, in which, perhaps, you will say there is nothing new. It is not my own; I have merely adopted it, and have endeavoured to make the most of it. If I have succeeded with these materials in producing pictures of perhaps more than average merit, certainly you may do the same. But do not let the first failure lead you to discard it. I am convinced that there are too many photographers amongst the "dry" men who, when the first two or three attempts at a process fail, rush to another, which, in its turn, is abandoned for one "just out." This is not the way to attain proficiency. If you persevere with the collodio-albumen process which I have just described, I think you will find it a very satisfactory one.

Allow me, then, to introduce—as I would an individual—this stranger amongst you. His character and testimonials are of the highest order. He is much esteemed in Manchester, where, I may say, he has not an enemy. Originally of French extraction (one of the Taupenot family), he is considered to be much improved during his residence in this country. Highly sensitive in character, the exposure of them any fine qualities he brought with him has resulted in their further development; and I believe it is his intention to fix his abode among us.

May I hope that you "will be happy to make his acquaintance"!

I cannot conclude without taking this opportunity of speaking in the highest praise of a very portable and excellent camera for 11×9 pictures, which I have now used for the last twelve months, and which is, I believe, the invention of your Honorary Secretary, Mr. Kinnear.* I have provided it for many of my friends in Manchester, who appreciate it as much as I do myself. I have much pleasure in thanking Mr. Kinnear—for self and brethren—for thus lightening our burdens, and thereby adding to the convenience and pleasure of our pursuits in Photography.

In the discussion which followed,

Mr. J. T. Taylor said he thought it was rather gratuitous in Mr. Mudd to talk of *introducing* this process to the Photographic Society of Scotland, since it was a well-known fact that many of its Members, both amateur and professional, had wrought with it ever since its first introduction into Britain. Englishmen, he found, were rather apt to imagine Scottish photographers to be more ignorant than they really were.

The Chairman said that he had had some experience last year with the process in question; and he had found the length of time required in developing the pictures a very serious drawback to its usefulness. Some had taken three hours to develope.

Mr. Orange said that if the developing fluid were made tepid, it would be found to reduce the time to five minutes. He had had great experience with this process, as he had made most of his transparencies by it.

Mr. Taylor stated that the method which he had communicated to the last Meeting, of developing dry plates by sulphate of iron, instead of gallic or pyrogallic acids, would be found very advantageous in this process, as it reduced the time of development from five minutes to a few seconds. [In answer to a question, Mr. Taylor stated that no matter how the dried plates were prepared, whether with albumen, gum-arabic, or saccharine preparations, he always developed successfully by copious washing after exposure, immersing in the nitrate of silver bath for a few seconds, and then pouring over its surface a simple solution of protosulphate of iron, which made the picture appear in 2 or 3 seconds. He concluded by saying that he had by this mode of procedure made so important a modification of the "gum-process" of Dr. Paterson, which was communicated at the last Meeting, that he intended to employ no other during the ensuing summer. In his estimation it left nothing to be desired.]

Mr. Dudgeon, of Cargen, corroborated the statement of the last speaker with respect to the superior advantages of sulphate of iron over pyrogallic acid. Some time since he had had a tour through Sweden, and had taken a stock of dried collodion plates, prepared for him by Dr. Norris, of Birmingham, and which he had most successfully developed with iron.

PHOTOGRAPHIC SOCIETY OF IRELAND.

This Society met in the School of Art of the Royal Dublin Society on Friday, the 24th February, Frederick Sanders, Esq., in the Chair.

The Hon. Secretary read a recommendation from the Council that the meetings of the Society should be held elsewhere than on the premises of the Royal Dublin Society, and it was referred to the Council to carry out their recommendation.

A letter from E. H. Tenison, Esq., was read, apologizing for his unavoidable absence, and consequent inability to read his paper and exemplify the manipulation of Baldus's calotype process, as announced for that evening's meeting.

Mr. Vickers, in consequence, proceeded to read Mr. Tenison's paper, in which he showed the superiority of Baldus's process over any other for taking large pictures on a foreign tour, the extreme simplicity of its details and certainty of its results recommending it to the travelling photographer. Mr. Tenison had practised it for months together in Spain: he stated that one of the greatest difficulties he experienced was in getting paper of the proper quality. When obtained, however, it will last in the iodized state for a very long period, and Mr. Tenison had iodized in a few days enough to last him two years, and he never

* See 'Photographic Journal,' Nov. 15, 1859.

found it deteriorate when kept free from damp. He much preferred the system of sensitizing by floating to that by means of the glass rod, and when starting on a tour, all his apparatus, trays, baths, &c. are made of gutta percha.

Mr. Beatty of College Green then exhibited specimens of copper-plates engraved by Mr. Fox-Talbot's system, and impressions taken from some of them; a plate, being a very beautiful miniature copy of the programme of the business for the evenings, was amongst them, and was pronounced by some of the members present to be capable of being made to yield a very large number of impressions.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

The 22nd Ordinary Meeting of this Society was held on Monday Evening, February 20th, at the Golf Club House, Blackheath Hill, the President, J. Glaisher, Esq., F.R.S., in the Chair.

The Minutes of the last Meeting having been confirmed,

Mr. H. T. Wood exhibited to the Society a compact developing box, which he described, dwelling particularly upon its internal arrangements, and stating among the advantages accruing from its use, that it was calculated to supersede the hot and inconvenient tent in field-work.

The President then proceeded to describe the method employed at the Royal Observatory for registering by Photography the diurnal variations of the thermometer, both dry- and wet-bulb, and exhibited several papers on which the process was indicated.

He stated, generally, that the method did not differ very materially from that employed to register the diurnal magnetic variations; that is, a ray of light is reflected, and condensed by lenses, upon a cylinder of sensitive paper kept revolving at a uniform rate by a chronometer movement, and so arranged that the column of mercury in the thermometer-tube, as it rises and falls with each successive change of temperature, cuts off or admits the light, which thus impinging upon the sensitive paper, registers its deviations in an irregular curved margin, the value of which is afterwards calculated. The whole process, as well as that for registering magnetic variations, proved the great benefit resulting from the application of Photography to scientific investigations.

On the Collodion Committee.

To the Editor of the Photographic Journal.

Sir,—The meeting of the Photographic Society on Tuesday last closed so unexpectedly that I had not time to reply to the remarks of the speakers who commenced the discussion. I must therefore ask your permission to do so, briefly, through the medium of your columns.

Mr. Heath has certainly been misinformed as to the number of members of the Collodion Committee who did not attach their names to the Report. That number, exclusive of Mr. Thurston Thompson, amounts only to *four*, and in every instance a satisfactory reason can be given. The Count de Montizon is in all probability absent from this country, as I am not aware of his having been at any of our meetings. Mr. Mayall likewise did not attend. Hence the names withheld are reduced to two, viz., Mr. Llewelyn and Mr. White, the former of whom was prevented from using his camera by those repeated attacks of illness to which he is known to be subject, and the latter was unable from other causes to experiment as much as he originally intended, but nevertheless consented to advise the Committee, and to preside at the drawing up of the Report.

Other names were eventually added to the Committee, viz., those of Messrs. Heisch, Spiller, and Maskelyne, and it was hoped that these gentlemen would lend their aid as scientific chemists. Either from some little misunderstanding, however, as to the manner of their appointment, or for reasons not ascertained, they did not respond, and no collodion was in consequence sent to them. The mention of these facts will be sufficient to convince the Members of the Photographic Society that the investigation has been conducted in a perfectly fair manner, and that everything has been stated openly, both for and against.

And here I would venture to remark that, although, from an unfortunate combination of circumstances, the "Opposition," if I may so term them, were permitted to gain a complete victory on Tuesday last, yet it is surprising how the aspect of the whole matter changes when it is viewed in another light. Mr. Heath is undoubtedly a skilful leader, and managed his case remarkably well; but the gloomy anticipations in which he indulged are so entirely destitute of foundation that they must not be permitted to go forth to the photographic world unchallenged. So far from the Society having made a mistake in appointing a Committee, we believe that the interests of photography will eventually be promoted by that step, and if not in any other way, at all events it will work well by exciting to fresh exertions those who require a stimulus of some sort to make them put forth their strength. It is undoubtedly a fact, that not long since the art was beginning to suffer from the supineness of many who had once been its main supporters, and

a spirit of despondency appeared likely to take the place of that active hope and enthusiasm which alone can gain the victory. I myself have heard an eminent chemist, second to none in his own department, express a belief that science would never touch the mysteries of photography; and another has also said in my hearing that the perfection of collodion was altogether removed out of our reach—that it had a certain *ripeness*, like old wines, which could not be imitated. Sentiments like these are depressing to one who has undertaken to be an instructor in photography; and he begins at once to cast about him for some more excellent way, by which the art may be improved. Vested interests (including his own) cry loudly in his ears, "We must live!" but he replies to them, as a writer once did to an individual who made the same observation, "It is quite a mistake! There is no necessity whatever for your living. As soon as you cease to be of use to society you may as well die at once." Now, this is precisely the case with us. The time has come when the importance of photography demands a sacrifice of individual considerations, as far as can reasonably be expected; and, without entertaining utopian views, we desire to see names of individuals giving way to chemical formulæ, and every operator working with tools, if not of his own manufacture, at all events within the compass of his proper understanding.

The particular examination of collodion which terminates with the paper given in this Journal has been continued now for three years; and during that time many hundreds of gallons have been prepared. It is not too much to affirm that the author has enjoyed unusual advantages for fixing his data, since many have assisted him whose names do not appear, and members well known in the Society have gone in and out at his laboratory almost daily. It was no presumption, therefore, to ask for the appointment of a committee, and especially so, as invidious comparisons were never intended to be made. Although the tone of the last meeting, as far as it could be interpreted, appeared adverse, yet the members of this Committee will still walk with their heads erect, and will not feel that they have any cause to be ashamed of what they have done. One, indeed, who has been classed with them as an aider and abettor, intends to go a step further, and to bring down more obloquy upon himself by proposing that the Collodion Committee of the Photographic Society be invited to resume its functions. Since "the one collodion of Mr. Hardwich" appears to have been the matter which gave greatest offence, let us do away with that apple of discord altogether by examining other collodions, if we can get them: only let it be understood that all formulæ sent in must pass the ordeal of a Board of Chemists appointed by the Society, to secure the working members of the Committee against impossible and useless preparations. Perhaps Messrs. Heisch, Maskelyne, and Spiller will now allow themselves to be nominated once more, and will impart to us their peculiar views on this question. I, for one, am prepared with a second formula, the pyroxyline of which is of a softer quality than the last, and suitable for working in a very strong light. I think it likely also, although I have no authority for saying so, that Mr. Thurston Thompson might be induced to come forward with a bromo-iodized collodion; so that we have still materials to work upon.

Those who have attended our meetings of late must have observed a little falling-off in the interest of the members. This, perhaps, is natural under the circumstances; but it is not justifiable; for where can an art be found that will compare with Photography? Mr. Faraday, in his lecture on "Lighthouses," on Friday last, pointed his finger at a lens of colossal dimensions, and said, "See, there is a *glorious* lens!" The expression struck me as being appropriate, especially so when the brilliant electric light appeared behind the lens. Much more, then, may we, who work with the sun itself, term the art which we practise a glorious art, and feel justly proud of its capabilities. Let the Photographic Society rouse itself, and exhibit once more that enthusiasm and devotion which established it in the first instance in its present position amongst scientific bodies. Our meetings will then be well attended, and there will be no lack of interesting and instructive papers. F. HARDWICH.

King's College, March 12, 1860.

Panoramic Photography.

By THOMAS SUTTON, Esq., B.A.

THE subject which I am about to introduce to your notice is one of considerable novelty, and, I think I may be allowed to say, importance. My paper relates to the construction and use of a new lens and apparatus which I have lately invented, by means of which photographic views may be taken at one operation, and with the same rapidity as at present, which include a wide horizontal extent of field, without involving any loss of light or good definition at the edges of the picture. For want of a better term, I have called this new lens a "Panoramic Lens," because it is capable of including distinctly in one picture

all that a person can see without turning his head. I have sent for your inspection a positive print, and also a negative of the same subject, taken with this apparatus; and from these specimens you will perceive that the lens fulfils the conditions which I have described.

The subject of Panoramic Photography is one which involves both theoretical and practical considerations. I think it would be injudicious for me, on an occasion like the present, to enter largely into the theory of the lens; I have therefore deposited with your Secretary a paper containing that theory fully discussed, and stating in algebraical symbols the formula for achromatizing the lens. That paper is at the service of your Society; and if your Council think fit to publish it, it would occupy, perhaps not unprofitably, about a page of your excellent Journal. Having therefore put you in complete possession of the theory of the lens, to be studied in private, I will now only briefly describe it, and then pass on to an account of the practical details of taking panoramic pictures,—observing brevity in my remarks; for I dare say you will have other interesting matters to occupy your attention when I have concluded.

The Panoramic Lens in its simples tform is shown in the instrument which I have sent for your inspection. It consists of two concave lenses of glass, forming portions of a spherical shell, and having the spherical cavity between them filled with water. In this arrangement you may imagine a glass sphere achromatized by having a spherical portion cut out of its centre, and the cavity filled with water. You will remember that, in achromatizing any convex lens by means of two media, the medium which has the *highest* refractive and dispersive power is made into a *concave* lens, while the medium which has the *lowest* refractive and dispersive power is made into a *convex* lens. I have observed this principle in the present case. The glass, having a higher refractive and dispersive power than water, is made into two *concave* lenses; while the water forms a *convex* lens. By giving to the inner curve of the glass lenses a suitable radius, any two lines of the spectrum which you wish to unite can be united, and the compound achromatised for photography; while this correction at the same time greatly reduces spherical aberration.

The equalizing stop which you will see in the centre of the lens is simple, and answers well in practice. Other more complicated contrivances might be employed; but, although theory might be more correctly satisfied, practical objections to their use would be introduced.

I would observe that a glass sphere may be achromatized symmetrically by inserting a central sphere of crown glass within a spherical shell of flint glass; but the focus of this compound would be so extremely short, as to render it practically useless; besides which, it would be impossible to introduce an equalizing stop into the centre of it.

The lens can be easily unscrewed, and the inside of the glasses wiped. It holds about half a pint of water. The diameter is 4 inches; focus $6\frac{1}{2}$ inches; and it includes an angle of 120° horizontally, and 45° vertically. The axis of every pencil passes through the centre without suffering deviation, and is incident at right angles upon all the surfaces. There is no such thing in this lens as an oblique pencil; and the picture is entirely free from distortion, and rigorously satisfies the conditions imposed by the laws of Panoramic Perspective.

There is no practical objection to the use of a fluid lens. The object-glasses of telescopes have been made with fluid lenses; and they perform remarkably well. Changes of temperature produce no *appreciable* difference in the focus of fluid lenses. I have taken a picture with the lens when filled with warm water, and the focus was not altered, neither was the definition affected in any appreciable way. In all climates and at all seasons, the focal length of the Panoramic Lens remains, therefore, the same for all practical purposes. I imagine that the changes produced by alteration of temperature in the glass, which is very thick, counterbalance to a great extent those which are produced in the water. The advantage of a fluid lens is, that it does away with internal reflexions.

On comparing the quickness of the lens, when used with a $\frac{1}{4}$-inch stop, with a single view lens by Ross of rather shorter focus and the same-sized stop, I found the latter much the slower of the two. The reason of this is, that a $\frac{1}{4}$-inch stop in the centre of the Panoramic Lens admits a pencil of nearly double the size upon the front lens.

The water should be changed every day the lens is used. It might be of advantage to use water which has been boiled to expel air, and filtered; but I have always used rain- or pump-water, without perceiving any ill effects.

An important merit of the Panoramic Lens is that it works clean. The pictures, as you perceive, are entirely free from fog, flare, and incomprehensible dark spots. The negatives exhibited have been fully exposed, and include a great deal of sky; and yet there is not the slightest indication of stray light. I am quite certain that "flare" is produced by internal reflexions; and the water completely obviates this source of mischief.

Enough has now been said about the lens. Let us pass on to the apparatus.

The camera exhibited is a somewhat heavy and complicated affair, because it is intended to answer a particular purpose. It is made either for paper or collodion, and is fitted with cylinders round which the paper can be wound, in a way which explains itself. But a Panoramic camera for collodion work alone is the lightest and simplest of all conceivable cameras.

No focusing is required. The focal length of the lens is first ascertained to the greatest accuracy; then this dimension is taken as the radius of the curved glasses, and afterwards the dark slide and camera are made to suit them. The only use of the ground glass is to enable you to see what objects you include in the picture; and in order to see them conveniently, the back of the simple camera should be curved.

There is no difficulty in the manipulation of curved glasses. I am delighted to find that I can coat a curved glass with collodion, and develope the picture just as easily and with as little waste of material as a flat plate. Your Secretary will no doubt kindly show you how I coat a plate. I begin at one end and bring the collodion gradually along in an advancing pool (which I replenish from time to time from the bottle) to the other end, and then tilt the surplus into the bottle. This I can do nearly every time without spilling a drop.

Now let us conclude with an inspection of the specimens. The negatives are fully exposed, and all the details are brought out. I do not think I have ever seen in any negative such fine definition as in these. There is surely something remarkable about it. The prints, however, scarcely do justice to them for want of albumen; but they show the prettiness of the subject, and prove that good contact can be obtained. These mounted prints are 12 × 5 inches, and the radius of the curved glass is 6½ inches; so that it is easily proved that the included angle is 105° horizontally, and 45° 14′ vertically.

It must not be supposed that the Panoramic lens is only suitable for extensive views; on the contrary, it can be used for *all* kinds of subjects; and it seems to me that many subjects which would not make a picture with the ordinary lens, make very pretty pictures with the Panoramic lens. The print which I exhibit is an instance of this. Cut out from it anywhere you choose a third part, and you get no picture, but taken as a whole the composition is very pretty. I find now that I cannot walk many yards in any direction round my house without getting pretty pictures, whereas before, with the old lenses, I could find nothing but bits of detail.

The camera which I have sent for exhibition is the first that has been made of the largest size, and the first with which I have gone out in earnest to take pictures. I had only five glasses sent with it, or I should have sent you a greater number of specimens; and now the apparatus is on its way to New York, so I am left for a few weeks altogether without one. There are always little troubles and delays in bringing out a new thing; but a couple of good negatives prove what can be done as well as a hundred.

I would observe that in taking views including a wide angle, it would be incorrect in theory to work upon a flat plate. An arc of a cylinder is the right form of picture. But in flattening out a cylindrical picture a species of distortion is introduced, and although the vertical lines of architecture remain straight and vertical, yet the horizontal lines are rendered by curves concave to the horizontal line of the picture. But this defect, if it can be called such, can be obviated by raising each end of the cardboard upon which the print is mounted, so as to form a circular arc, and viewing the picture with the eye in the centre of that arc and at a proper distance from it. I do not anticipate, however, that the distortion to which I allude, for the mere purpose of anticipating an objection, would be disagreeably obvious in practice; neither am I at all sure that it can properly be called distortion.

It is important that I should state that there is no necessity for the two halves of the lens to be alike, or made of the same kind of glass. It is enough that all the four surfaces of the lenses are parts of spheres which have a common centre. By making the front lens of crown and the back lens of flint glass, according to computed radii, three lines of the spectrum may be united instead of two.

In a Panoramic lens patented last year in France by M. Porro, all the lenses are made of glass, and there are oblique incidences introduced, and no means employed for equalizing the illumination. The principle of this lens is so obviously wrong, that it is not necessary seriously to discuss it.

I must now conclude, as I have already occupied more time than I ought. On looking my paper over, I perceive that I have spoken with a good deal of enthusiasm of my new lens. You must forgive it. I have spent many anxious hours and gone through a great deal of trouble in perfecting the lens so far. If I speak too warmly of its merits, or estimate its practical importance too highly, believe me, this is not done in an egotistic spirit. It is

not because I have invented the lens that I feel so greatly interested in it. If any one else had invented it before me, and I had merely worked with it and produced good pictures, I should be equally warm in my advocacy of it. It is well known that I am no niggard in my attempts to bring forward new and useful inventions, from whatever quarter they may originate. If, then the Panoramic lens should prove a useful invention, as I trust it will, and enable photographers to achieve higher triumphs than they have yet achieved, I shall interest myself in bringing it forward more on account of its intrinsic utility and the advantage it may prove to others, than for the sake of any glory or profit that it may bring to myself.

I need hardly say, that if my paper should elicit any remarks or provoke a discussion, I shall be grateful for any information or useful hints which can be gathered from such a discussion.

I beg to assure you that I feel a sincere interest in the prosperity of your Society and of its excellent Journal, from which we have all gathered so much valuable information in the different branches of photography. May the Photographic Society long continue to maintain a leading and dignified position, and pursue its career of usefulness unimpeded!

Theory of the Panoramic Lens.

By Thomas Sutton, Esq., B.A.

There are three different forms of Panoramic Lens.

The first is a glass sphere achromatized symmetrically by means of an internal sphere composed of a medium of lower refractive and dispersive power than the external spherical shell.

The second is a lens similar to the former in principle, but differing in this respect, viz., that it consists of two half-lenses of the first form, the two outer shells not being necessarily of the same material or radii.

The third is an arrangement which includes also the camera. It consists of a hemispherical shell of glass attached to the front of the camera, and the space between it and the sensitive plate or paper filled with fluid. The convex side of the lens is turned towards the objects to be copied.

In every case the lens is fitted with an equalizing central diaphragm, by means of which the pencils are reduced to a suitable diameter, and the light equally distributed over the picture.

The theory of the first and third forms of Panoramic lens is simple, because it merely involves the achromatizing of the compound by uniting two lines of the spectrum in the focus; but the theory of the second form of lens is more complex, because it involves the uniting of three lines of the spectrum, and also the reduction of spherical aberration to a minimum when a large diaphragm is used.

For all present practical purposes of photography the first form of Panoramic lens is sufficient. The second form may at some future time be required for a scientific purpose; and the third form may be found useful in practical photography under circumstances which render the present processes inconvenient.

In this paper it will be sufficient to investigate the formula by which a sphere may be achromatized symmetrically. This investigation is, so far as I am aware, quite new; no lens of that form having been constructed, or described in any optical work, prior to my invention of it.

The object is to find the radius of the inner sphere so that two given lines of the spectrum may be united in the principal focus of the lens.

Let us agree to call X, Y the lines which are to be united, so as to render the lens photographically achromatic. Let unity be the outer radius of the spherical shell, r the radius of the inner sphere; then r is the unknown quantity.

Let m = refractive index of line X from air into glass.

m' = refractive index of line X from air into water.

n = refractive index of line Y from air into glass.

n' = refractive index of line Y from air into water.

F = principal focal length of lens for lines X and Y, when united.

Let us first calculate F for an axial pencil of homogeneous light corresponding to the line X.

To do this, let v_1, v_2, v_3 be the geometrical focal lengths of the pencil, measured from the *centre* of the sphere, after refraction at the 1st, 2nd, and 3rd surfaces respectively.

Then, at the 1st surface we get

$$\frac{1}{v_1} = -(m-1) \qquad (1)$$

At the 2nd surface,

$$\frac{m'}{mv_1} - \frac{1}{v_2} = \frac{m'-m}{mr} \qquad (2)$$

At the 3rd surface,

$$\frac{m}{m'v_2} - \frac{1}{v_3} = \frac{m'-m}{m'r} \qquad (3)$$

At the 4th surface,

$$\frac{1}{mv_3}-\frac{1}{F}=\frac{m-1}{m} \quad \ldots\ldots\ldots\ldots (4)$$

Eliminating v_2 between equations (2) and (3) gives

$$\frac{1}{m_1}-\frac{1}{m_3}=2\frac{m'-m}{mr} \quad \ldots\ldots\ldots (5)$$

And eliminating m_1 and m_3 between equations (1) (4) and (5) gives

$$\frac{1}{F}=-2\left\{\frac{m'-m}{mm'r}+\frac{m-1}{m}\right\}.$$

Proceeding in the same way with the axial pencil corresponding to the line Y, we get

$$\frac{1}{F}=-2\left\{\frac{n'-n}{nn'r}+\frac{n-1}{n}\right\}.$$

Equating these two values of F gives

$$\frac{m'-m}{mm'r}+\frac{m-1}{m}=\frac{n'-n}{nn'r}+\frac{n-1}{n},$$

which is a simple equation for determining r so that the lines X and Y may be united, and the lens thereby achromatized.

In order to render the focus of the achromatized lens as long as possible, the *outer* shell should be made of the *highest* possible dispersive and refractive material, and the *inner* sphere of the *lowest* possible dispersive and refractive material. Flint glass and water are very convenient substances to employ, and when used, the focal length of the lens is nearly four times its radius; and the inner sphere is about one-half the diameter of the outer one.

Jersey, Febr. 11, 1860.

Hyposulphite of Soda affected by Cold.

To the Editor of the Photographic Journal.

Maison Ramonet, Bagnères de Bigorre,
Feb. 21st, 1860.

SIR,—I have met with an occurrence which has caused me some trouble and the loss of a large number of prints during the last few days, which may be interesting to some of your readers; and I should be happy at hearing the result of my observations confirmed by some other practitioner.

During the last few days we have been subjected to the most unusual change of temperature, fine mild weather having given place to snow and intense cold, such as has never been known since the winter of 1839. This cold appears to have affected my solution of hyposulphite of soda, which suddenly lost its solvent qualities.

Positives immersed in the solution did not become fixed, but only a double decomposition took place in the interior of the proof, by which the chloride of silver became converted into the hyposulphite of silver, which latter salt soon again decomposed with formation of the sulphuret of the same metal.

The same solution of hyposulphite, on being again warmed to 60° or 70° Fahr., fixed pictures perfectly. The proofs above mentioned were coloured by my process with the phosphate of gold, as before described in your pages.

The knowledge of this diminution in the solvent qualitics of hypo, produced by cold, will be, I think, of much practical utility, and may explain some anomalous failures hitherto unaccounted for.

F. MAXWELL LYTE.

The Spot in the Centre of the Plate.

To the Editor of the Photographic Journal.

SIR,—In the Number of your Journal for December there appeared a letter from Mr. Sutton, in reply to a correspondent in the previous Number, in which Mr. Sutton treats of the appearance of a dark spot in the centre of the plate, when using, for landscapes, a portrait combination with a stop between the lenses. I cannot but express surprise that a doubt should long remain in the mind of any scientific photographer as to the true nature and cause of this appearance.

Several years ago, after suffering much annoyance from the intrusion of this spot into the centre of my pictures, I set myself to investigate the cause of it. On very careful inspection, I found that a similar spot appeared on the ground glass on focusing, and on further examination I found it to be an image of the aperture in the diaphragm; and I proved it to be so by cutting the hole in the diaphragm of various shapes, which were accurately reproduced on the ground glass and photographic plate. I found, moreover, that the focal length of this image was shortened or increased according as the stop was placed further from or brought nearer to the back lens; so that, according as the stop was placed, its image appeared either as a sharp, well-defined spot, or as a misty patch upon the plate. The cause soon became obvious. When light falls upon a transparent substance, such as glass, a small portion is reflected, while the greater part is transmitted; consequently in a photographic lens, while the greater part of the light which falls upon it goes to form an image by refrac-

tion, a small portion is reflected by the back surface, again reflected by the front surface, and forms a focal image by reflexion, at about one-tenth of the distance behind the lens of the image formed by refraction. In combinations of two or more lenses, the number of images thus formed by reflexion is immense, as may be seen by pointing a portrait lens and camera to a candle at night, when an immense number of secondary images may be seen in the line of the optical axis—some in front of the lens, some between the lenses, and some behind the back lens.

The spot complained of by Mr. Sutton is formed by an image of the stop, having the objects in front of the lens (immensely out of focus) showing through it.

The relative intensity of the light of this spot is always the same, its *size only* differing with the size of the stop used. Consequently, when a large aperture is used, the picture is taken so quickly that the spot has not time to impress itself; but it becomes more and more visible upon the photographic plate as the size of the stop is diminished, because then the time of exposure required to produce a picture is increased.

The reason why this spot is seldom seen on plates taken with a landscape lens is, that in that case the focal point of the spot is about halfway between the lens and plate, on reaching which it is too dispersed to be perceptible, or, when a very small stop is used, manifests itself only as what is called diffused light in the centre.

Onward.

Upon the Use of Stops.

To the Editor of the Photographic Journal.

Hastings, March 8th, 1860.

Sir,—My remarks upon this subject, published in your January Number, have apparently been misunderstood; and as I believe it very desirable fully to discuss this question, more especially with regard to future improvements in photographic lenses, I wish to trouble you with further observations. My last letter referred almost entirely to landscape lenses; for they are the most concerned in this question, and, almost every variety requiring a small stop to produce a well-defined and tolerably accurate image, it is certainly important that the stops should be placed at the best distance from the lens.

Now, I do not assert that our best makers do *not* place *a* stop or *the* stop correctly; but they wilfully or stupidly place *all* the stops in the same position; and, as it frequently happens in practice that a change of stops is advisable, owing to a deficiency of light or the necessity for very rapid action in taking some pictures, it is essential that *all* the stops should be properly placed to produce an image of equal illumination and comparative sharpness over all the field, and this is impossible with all the stops in one position.

A great consideration in testing a lens is the *size* of the stop, and few are aware of the vast influence this has upon the time of exposure required in taking a photograph; yet it can easily be calculated by simply comparing the squares of the diameters of the various stops to be used, and the time will be in inverse proportion. Thus it will be found that an inch stop is sixteen times larger than a quarter inch stop, and consequently sixteen times quicker. The immense advantage of large stops cannot therefore be overrated; but unfortunately the lenses now manufactured to give correct and fine definition with large stops, are generally very deficient in "*depth of focus;*" and rapidity of action without *that* is a delusion.

All stops are literally very material hinderances to perfection in photographic action; but as they are at present very "necessary evils," it is requisite to apply them to the best advantage. Of course, the longer the focus of the lens, the larger the stop may be; and I know of nothing more thoroughly illustrative than the comparison of solid lead pencils of different diameters; for the thicker pencil must be sharpened to a longer point (or focus) to produce as fine a stroke as the smaller one. These "pencils of lead" likewise will fully indicate the pencils of light passing through stops of proportionate sizes, and explain the argument relating to their positions,—the refraction of light by the lens not affecting the conditions, because the stops have no material influence upon such refraction.

J. R. H.

Spontaneous Combustion of Gun-Cotton.

[From the American Journal of Photography.]

Dear Sir,—The following are plain statements of fact in relation to the spontaneous combustion of gun-cotton.

While at work in my room, a spontaneous combustion of more than two ounces of gun-cotton took place in my trunk, with a loud report, filling the contents of the trunk with fire and smoke, which would have been destructive, had no one been present.

I purchased the cotton some three months

previous, and made good collodion from it, but laid it by to use another sample.

About two weeks before the explosion, I accidentally observed the bottle to contain a yellow vapour; and on removing the cork (which was much softened), strong acid fumes escaped.

I put in a few drops of alcohol, which absorbed the vapours; I then sealed it, put it into the trunk again; but on looking at it again a day or two before it took fire, the yellow vapour had again collected; but as I had not heard of spontaneous combustion having ever taken place, I put it back, and the next thought of it was caused by the report, as above stated.

What caused the cotton to ignite? Is this an isolated case? I have had other samples develope reddish-yellow vapours; and as it is good for nothing in that state, I have thus far destroyed it before it destroyed me.

G. W. Robbins.

Mississippi River, Oct. 29, 1859,

[We remember some years since purchasing a bottle of gun-cotton, prepared in Paris, which, as soon as the cork was removed, immediately emitted fumes of nitrous acid, and probably would have ignited, if it had not been plunged into water.—Ed.]

A full report of Dr. Roscoe's Lecture at the Royal Institution, "On the Measurement of the Chemical Action of Light," will appear in our next.

Archer Fund.

Contributions continued.

J. Middleton, Esq.	£2	0	0
Per Thos. Sutton, Esq., Jersey..	3	3	0

Blackheath Photographic Society.

Page 159, *for* Camera lucida *read* Camera obscura.

CORRESPONDENCE.

Gentlemen desirous of admission into the Photographic Society, are requested to communicate with the Secretary, 1 New Coventry Street, Piccadilly, W.

An Amateur (*Bewdley*).—1. The precipitate may be reduced by heat, and afterwards dissolved in nitro-muriatic acid, but you will scarcely find it worth your while to do so. 2. Use a landscape lens, and let the exposure be very long—say at least for half an hour. If a double combination lens is used, then apply a diaphragm after taking the focus. Your third question is answered in the first page of the present Number.

An Amateur and Subscriber.—Varnish-makers sell a varnish under the name of "White Hard Spirit Varnish," which answers the purpose very well. We have often recommended the varnish of Soehnée, made in Paris, and generally to be met with at dealers' in photographic chemicals. The amber and chloroform varnish is also most excellent, but more expensive for out-door work, where heat cannot well be applied: to harden a freshly varnished picture, there is none so good as the amber and chloroform, which dries immediately.

J. S. (*Edinburgh*) *and H. B.* (*Brackley*).—There is a very useful elementary work on the collodion process by Mr. Hennah, of Brighton. Messrs. Bland, Messrs. Murray and Heath, and other respectable dealers in photographic materials, have issued little guides to the use of the various preparations which they supply. For the more advanced student, Mr. Hardwich's Manual will supply the information, and may be procured of photographic dealers, or of the publisher, Mr. Churchill, New Burlington Street.

A. R.—Mr. Kilburn has consented to exhibit and describe Woodward's Solar Camera at the next or following Meeting of the Society, which description will appear in the 'Journal.'

H. H. (*Gallowgate, Glasgow*).—We have received no communication from you since the time you corresponded with the Editor of 'Notes and Queries.'

G. H. (*Halifax*).—1. In colouring an albuminised picture, a good supply of ox-gall (which is sold at all colour-shops) is mixed with transparent water-colours. 2. There is a preparation also for giving them a high gloss, which is used in a similar manner as French polish is applied. The white hard spirit varnish made for varnishing maps, Tunbridge ware, &c., answers the purpose exceedingly well. 3. The whitening process was first used by Mr. Archer, but never came into general use, from the pale blue tint, which is so unfavourable. If you develope your picture with a solution of protonitrate of iron, prepared with nitrate of baryta and sulphate of iron, you will have a bright silvery surface; but the high lights are rendered quite ivory-like by the addition of glacial acetic acid. By experiment you will arrive at the result you require. About 40 drops of glacial acetic acid to an ounce of the iron solution we have found to be satisfactory.

Weymouth.—It has been determined that the brain-like markings which occur in Taupenot's process are caused by using the albumen of too thick a consistence. It seems to be a law of some fluids to dry in this form. If black varnish is used for positives after it has become old and thick, a similar appearance takes place.

Slade Aston.—Sulphate of iron should be kept from the atmosphere. A few drops of alcohol poured into a bottle containing it, and then shaking the bottle so as to moisten all the crystals, we have found to favour its preservation for a very long period.

The description of Mr. Alfieri's Portable Developing Camera, and Mr. Barnes's paper "On the Manufacture of Collodion," are both in type; but we are compelled to delay their publication until our next issue, from the great length of our Reports of the Societies.

Communications received. — J. A. Forrest, Esq.; Mr. Goddard; ——. Oxford House, Cirencester; Mr. Sebastian Davis; J. Middleton, Esq.; Mr. Robinson.

Letters of inquiry to the Editor can be answered only through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. Taylor and Francis, Red Lion Court, Fleet Street.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 96. APRIL 16, 1860.

Our occupancy of the rooms in Coventry Street has now ceased, and the home and centre of the Photographic Society will be henceforth at King's College. The change of locality is one which we confidently anticipate will prove beneficial to our interests in every way. The first meeting in our new apartments will be held on the 1st of May, on which occasion the Lord Chief Baron will take the Chair, and the discussion on the Report of the Collodion Committee will be resumed.

In 1855 Colonel Henry James, F.R.S., introduced a method of reducing the Ordnance Survey (on which he had been employed for many years, and for his eminent services in which he has recently been rewarded by Her Majesty with the honour of knighthood) to any given scale by means of photography. From that time his researches have been continued with great success. He has now attained a power of transferring the photographic picture from the glass negative on to a zinc plate, from which he can print as easily as from a lithographic stone. Of his success in this transfer our readers can judge for themselves, as Sir Henry, with very great liberality, has placed in our hands 3000 copies of a print so transferred, for distribution amongst our subscribers. These copies are given with the present Number of the Journal.

An extended account of the methods used in the reduction of plans, &c., under Sir Henry James's direction, together with full details of the process of Zincophotography, we must ask our readers and friends to peruse in our next Number, as any abbreviation of this paper would be unsatisfactory to them. The report of the Meeting of our own Society, together with the conclusion of the Report of the Collodion Committee (which is to be discussed on the 1st of May), also the reports of other Photographic Societies whose proceedings we undertake to give to the public, occupy an unusual extent of our present Number.

We offer to Sir Henry James the best thanks of the Society, as well as of photographers generally, for the important services which he has rendered in the application of their art. The prints struck off after 3000 copies have been taken are as good as those first pulled from the press, proving that the plate suffers so trivial a deterioration that it may be used to the extent of 20,000 or more with perfect success.

Our Seventh Annual Exhibition of Photographic Works has been closed for the season, as far as regards the locality of Pall Mall. With a few exceptions, the Collection has been transferred to the Crystal Palace, on the ample and convenient walls of which it is now being arranged. The Directors of the Company have shown throughout an admirable courtesy and liberality. They have given up one of the best points in the Palace; they have removed our collection at their own charge; they will provide every exhibitor, without exception, with a season-ticket for the year; and they have expressed, generally and warmly, a desire to aid in developing the capa-

bilities and attractions of the Photographic Art. For all these things our thanks and the thanks of our friends are due.

The particular spot in the Crystal Palace chosen for the Exhibition is on the first floor, nearly facing the grand organ, and extending along the gallery towards the Tropical Department.

Lieutenant Cheyne, of the Royal Navy, has made and published a series of fourteen stereoscopic slides, representing the relics of the Franklin Expedition. The descriptive book is inscribed to Lady Franklin, and accepted by her in a note which testifies to the fact that Lieutenant Cheyne is an experienced Arctic voyager, as well as a capital amateur photographer. The slides reproduce and render visible, in the exact vividness and particularity of life, the man, the ship, the means of discovery, with the whole detail of the things discovered. In following the toils of this noble enterprise—toils followed with hushed breath and a yearning heart wherever the English language is spoken and manly courage and womanly devotion admired—the reader in Canada, at the Cape, at Sydney, at Calcutta, to whom an actual glimpse of the Franklin relics is among impossible dreams and desires, may now travel, by help of these stereoscopes, over the scenery of this perilous expedition with a realizing sense of its grandeur and desolation, its dramatic incidents, and its new discoveries.

Here he may see, not in the pale reflex of words, but in the very form and substance, those two yet loaded guns which read so strange a lesson of the perishing frailty of the strong and cunning hand — may trace the moral which spoke so hopefully and falsely of the expedition as "All Well"—may gaze on the circle and field-glass, the rusty iron, and torn fragments of clothes, which suggest a whole epic of heroic suffering and endurance, just as the print of a man's foot in the sand told Crusoe of the world of unexpected peril and of hope which lay about him. All these things, simple in themselves, yet bring the situation of the scene to life in a vivid manner.

From the study of the frozen deep we are driven by another series of stereoscopic studies into the dim beauty and silence of the great Abbey. Mr. Prout has photographed, and Mr. Elliott published, twelve views in Westminster Abbey, most of them well chosen and ably brought out. The south aisle of the nave is a wonderful instance of reproduction, of a rich transparent depth of glow and light. This view is perfectly Turneresque in its brilliancy and burning flush of air. The choir, again, is a picture for David Roberts to hang upon in rapture: the foreground a little thick and indistinct—perhaps unavoidably so; but the fretted roof, the pillared galleries, the stained oriel, are astonishingly beautiful and suggestive —in some points snatching a grace beyond the reach of art.

Some specimens (for the stereoscope) of instantaneous photography, representing the fashionable streets of Leamington, by Mr. H. P. Robinson, are also before us, showing how much may be done in recording the passing objects of the day.

In our advertising columns will be found Mr. Hering's reply to Mr. Kilburn, to which we beg to direct the attention of our readers.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

PHOTOGRAPHIC SOCIETY OF LONDON.

ORDINARY GENERAL MEETING.

TUESDAY, APRIL 3, 1860.

ROGER FENTON, Esq., Vice-President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The following gentlemen were elected Members of the Society:—

Lord HENRY GORDON LENNOX.
WM. H. LINTOTT, Esq.
FREDERICK COX, Esq.
Mr. THOMAS CLARK, Jun.
Mr. JOHN HENRY DALLMEYER.
Rev. E. F. BOYLE.

The SECRETARY read a letter he had received from Dr. Becker, thanking the Society for the pleasure they had afforded him in electing him an Honorary Member.

Mr. MALONE made some observations respecting the unexpected conclusion, at the last Meeting, of the discussion upon the Collodion Report and Mr. Hardwich's paper.

The CHAIRMAN suggested that Mr. Malone could give notice of motion to re-open the dis-

cussion; and later in the evening the following resolution was moved by Mr. Mayall, seconded by Mr. Malone, and duly put and carried:—"That this Meeting recommend the Council to re-open the discussion on the Report of the Collodion Committee, and on Mr. Hardwich's paper on Collodion, at the next Meeting in May, 1860."

Messrs. Marion, of Regent Street, exhibited two of their Cases for keeping paper in a fit state for use a long time after it has been sensitized; the cases are applicable for either glass or paper. A picture was also exhibited, taken by Mr. Percy Standish, and a letter read by the Secretary from that gentleman, highly commendatory of the invention. The plate on which the negative was taken had been sensitized in August last, and the picture produced during the month of March. A Member stated that he had found the Case very useful for preserving albuminized paper for printing positives on after it had been sensitized, when the weather or other causes had hindered him from using it.

Mr. Shadbolt exhibited a very ingenious and effective arrangement for exposing and closing two or four lenses simultaneously for instantaneous pictures. He went through a description of the apparatus, which, though simple and easily described with the apparatus in hand, requires diagrams to make our report effective.

The Secretary read the following papers from Mr. Sutton:—

Mr. Chairman and Gentlemen,

I regret that I cannot be present at the discussion on the Panoramic Lens, but Mr. Cox will show you some apparatus, and explain how to use it.

The No. 2 lens and camera for pictures 7×3 can be carried in the coat-pocket. The little pictures taken with this instrument and printed upon albuminized paper are very pretty, and the details very fine and elaborate. It is suitable for taking most interesting little views of skies and waves instantaneously, with the large stop. Artists who travel for the illustrated journals would find it convenient to use this camera and take their pictures upon dry collodionized sheets of mica, a hundred of which would occupy but little space in their pocket. I cannot promise that the negatives would be so perfect as those upon glass, but they would be of great use to wood-engravers.

The No. 4 apparatus for pictures 15×6 is very suitable for amateurs who work with the wet-collodion process in a narrow tent. As the curved glasses are expensive, I should advise not to take more than six for an ordinary trip. All negatives which are not absolutely first-rate may be removed from the glass by the following simple process:—Dry and varnish the negative with spirit varnish; then apply to the film a damped sheet of gummed paper. Let this get dry spontaneously; then put it into water and peel it off the glass. In this way you have a paper negative of the subject you wish to preserve, and a clean glass for another attempt. I fancy no one would dream of transferring a first-rate negative.

The best lens for paper pictures is that which I call No. 6. This is 4 inches diameter and 12 inches focal length. The focus being so long in proportion to its diameter, it will not work so quick as the other lenses. This lens will cover half a sheet of Canson-paper, or even 25×10 inches, if the paper is large enough. With a $\frac{1}{4}$-inch central stop it admits a $\frac{3}{8}$-inch pencil up the front lens. With a high-view lens 12 inches focus and a $\frac{3}{8}$ths stop, a paper negative can be taken in full sunshine in three minutes, or less. The time of exposure being the same with the No. 6 panoramic lens, it follows that paper negatives 25×10 can be taken in three minutes; that is, in the same time as ordinary paper negatives 8×6.

I strongly recommend the No. 6 lens and the paper processes to the notice of amateurs. Hitherto the collodionists have had the laugh against the paper men, but now the paper men can turn the tables upon the collodionists. While the latter are afraid of venturing even upon a No. 4 panoramic, and contenting themselves with 9×7 flat pictures and angles of 35°, the paper operators can produce grand panoramic pictures, accounts of which would fill the newspapers next year, while the 9×7 bits by collodion would be treated as mere repetitions of what has been done before equally well. The panoramic lens is a grand opportunity for paper work, and it introduces no new difficulties whatever; in fact, the time of exposure is reduced.

In definition and perfect achromatism the panoramic lens is unsurpassed. All along the horizontal line of a view embracing 120°, the definition is as good as it is in the centre of the best flat picture. If in any case it should fail at the sides of the picture, that could only be attributed either to an inaccuracy in the radius of the curved glasses, or in the centering or mounting of the lens. Such an accident ought never to occur now that we have got things into good working order.

No focusing is required. All objects upon the horizontal line are in focus which are situated between a certain distance from the lens and an infinite distance from it. That certain distance depends upon the focal length of the

lens and the size of the stop. If we call that distance the "focal depth of the lens," then the focal depth of the No. 4 lens with a small stop is about 30 feet, and the focal depth of the No. 2 lens 15 feet. The shorter the focus the greater the focal depth. I have never found the use of focusing in any view-lens, and I worked for two years almost daily without altering the focus of my lens. The smallest stop was the remedy for all optical, as well as for some chemical difficulties. If every one agreed with me, and had thought the matter over as much as I have, we should hear no more of the double-bodied sliding and folding view-cameras, or of any of the complicated contrivances for focusing; nothing would be seen out-of-doors but the single folding camera which came out soon after the discovery of photography, and the panoramic camera which we are now discussing. My advice is to focus for an extremely distant object in the centre of the picture, and fix the lens at that. If any very near object is refractory, humour it with the smallest stop. An object must be very close indeed if that does not make it sharp with a short-focus lens.

The mode of coating a curved glass 15 × 6 is shown in the following diagrams.

You hold the glass with its convex side towards you, and begin by pouring the collodion upon one end, as shown in fig. 1.

You then gradually elevate the coated end and lower the other, letting the pool of collodion flow towards the middle until half the plate is coated, as in fig. 2.

Fig. 2.

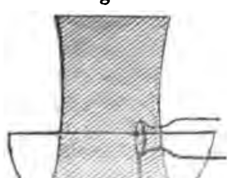


Fig. 1.

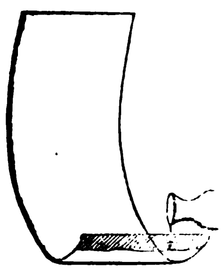


Fig. 3.

You continue in this way until the whole of the plate is coated, and then you pour off the surplus collodion into the bottle, as shown in fig. 3.

In developing the picture, you pour on the developer in exactly the same way, only rather quicker; and you let the developer flow backwards and forwards from one end of the glass to the other, until all the details are fully out and the proper intensity obtained. The left hand should be protected from stains by wearing an india-rubber gauntlet, and a sheet of thin gutta-percha should be tied over the sleeve of the left arm.

Any collodion will do in cold weather: but I have no doubt that, when the hot weather comes, alcoholic collodion will be indispensable to success.

In sun-printing, the pressure-frame must be turned twice during the exposure; and it is the trouble of doing this which constitutes the chief and, in fact, *only* drawback to panoramic photography. I foresee that, with many persons, this will be a fatal objection, although others may make light of it. He who can get a good negative will probably make little difficulty of the printing.

It is scarcely necessary to say that no one should attempt to work with collodion upon curved glasses unless he is sure that his chemicals are in good order. The object is not to experiment, but to take pictures. Flat plates are better for experiments, because, if they get broken, there is less harm done. Anxious as I am to see the panoramic lens come into general use, I do not desire to see it at first in any other hands than the most experienced. Until a few first-rate photographers have tried the lens and expressed their opinion of it, and exhibited specimens, I do not care much to see it in the hands of the inexperienced. Better make sure work, and go on slowly at first. But panoramic photography is a new field, in which those who first succeed will carry off the highest prizes.

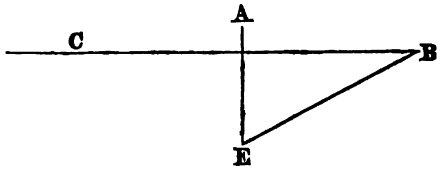
On Panoramic and Plane Perspective.

By Thomas Sutton, Esq., B.A.

In Plane Perspective, when a wide field of view is included, the objects at the sides of the picture appear mis-shapen and disproportionately large. They appear mis-shapen because the pyramids of visual rays of which the eye is the vertex are cut by a plane inclined to those rays at an angle of *great* obliquity; and they appear disproportionately large for a reason which will be explained by the following illustration.

Suppose E to be the eye of the spectator: BC, the plane of the picture; A, a man standing at a distance from it on the side opposite to E. and in front of E; B, another man of the same height standing quite close to it, but much farther from E, and greatly to the right. Now, in this case, the man at B will be drawn life-

size upon the picture, while the man at A will be drawn less than life-size; that is to say, the man who is farthest from the spectator will be



represented as larger than the man who is nearest to him. This shows the absurdity of plane perspective when the field of view embraces a wide angle. The absurdity would not, however, be apparent if, when viewing the picture, the eye were confined strictly to the proper point of sight, and the side objects viewed very obliquely; but that is not the way in which pictures are looked at. In order to get distinct vision of the whole picture, the spectator takes a position about twice the breadth of the picture from it; and, in order to inspect more closely the separate points, he walks up to them, and brings the eye directly opposite to the part which he is examining. No one would ever dream of walking close up to the middle of a very wide picture, and looking at the ends of it obliquely from that station. It follows, therefore, that plane perspective will not do for views which contain a very wide angle. Even in correct drawings in plane perspective which include the moderate angle of 45°, there is something strange, unintelligible, and inartistic about the shape and size of the marginal objects.

It is evident, therefore, that if we wish to take a picture including a wide field of view, we must give up the idea of taking it upon a flat surface. If it were possible to construct a lens which should include a field of 120° upon a flat surface, the picture would be a hideous caricature.

The proper kind of perspective for a wide angle of view is Panoramic Perspective; and the proper surface for taking a panoramic picture upon is a vertical cylinder with the eye at the centre.

But, in viewing a cylindrical panoramic picture from the centre, we can see only one part at a time. The eye is not a panoramic lens with a diaphragm in the centre, so that everything can be seen distinctly at once, but a lens with the diaphragm or pupil in front, and it only gives distinct vision of one object at a time. Watch any one reading a large folio volume in old and faded type; how his head moves from one end in a line to the other, and back again, so as to bring the eye opposite to each word in succession, in order that he may see it most distinctly. But it matters not whether, keeping the eye at the centre of the cylinder, we turn its axis round to the different parts of the picture in succession; or whether we flatten out the cylindrical picture and view its separate parts by giving the eye a motion of translation along it, so as to bring its axis opposite and perpendicular to the different objects in succession. It matters not whether we perform a pirouette upon our heel in the centre of one of Mr. Burford's panoramic views, or whether we spread the picture out flat, and view it while walking upon a stage parallel to it,—or whether, while we stand still, a small portion of it at a time is brought into view by being unwound from one vertical cylinder and wound upon another;—all these plans are right in principle, and involve no absurdity, because, in all panoramic pictures, the farther a thing is off, the smaller it is represented, and the common sense of the spectator is not outraged or his wits puzzled by unintelligible freaks of perspective at the sides of the picture.

If a panoramic picture is spread out flat, and the eye placed at such a distance from it that the whole can be included at one glance, the spectator might be puzzled, did he not, by comparing the small height of the picture with its length, and the multiplicity of objects included in that length, become aware at once that it was in ordinary plane perspective, and, consequently, not intended to be viewed in that way. Nevertheless, from the graceful curves of the vanishing lines—the long flowing lines of the composition, and the absence of all misshapen, distorted, and unintelligible representations of things, panoramic pictures flattened out are not only vastly more interesting than common views, but infinitely more artistic.

If a crescent of equal and similar houses were taken by a panoramic lens placed at the centre of the crescent, the picture when flattened out would be the same as if the houses had been placed in a straight row and taken upon a flat picture parallel to them. One could not, therefore, tell how such a picture had been taken unless a description were appended to it. But this would not constitute a special objection to the panoramic picture, because it would cut both ways. Tell us what lens the picture was taken by, and then we know all about it.

Towards the close of the Crimean war, Mr. Robertson, of Constantinople, took from the same station three views of Sebastopol, so as to form, when mounted side by side, a sort of panoramic picture, including an angle of about 100°. Although it possessed extraordinary interest, one could not help regretting the defects occasioned by the joinings of the prints, which

being better in definition and more strongly lighted in the centre than at the edges, the three patches of light and two dark joinings did not look well. But when the panoramic lens is employed and the whole picture taken at once, the definition is equally good along the entire horizontal line, and the light equally distributed.

It is evident from what has been said that plane perspective is wrong in theory for pictures which include a wide angle, and panoramic or cylindrical perspective quite correct.

When the axes of all the pencils pass straight through the centre of a panoramic lens without suffering deviation, the image upon the cylinder is geometrically correct, and absolutely free from distortion.

The Chairman asked Mr. Cox to explain the use of the camera.

Mr. Cox stated that he had not the slightest idea that he should have been called upon to explain the use of the camera; and although he found that Mr. Sutton had forwarded an intimation to the Society that he (Mr. Cox) would do so, he had not sent a like intimation to him. He merely attended the Meeting as a visitor, and therefore hoped to be excused if his description was not so full and clear as it would have been had he been prepared—he regretted it, because he had no collodion with him. [Mr. Cox then explained the use of an instrument for holding the bent glass, which was an ordinary clamp adapted to the bent plate instead of a flat one; there was the dark slide of the camera like an ordinary glass slide, excepting that it likewise was curved in the form of a segment of a circle.] The camera, with regard to the focusing was rather in contradiction to the terms of Mr. Sutton's communication. There was a slight focusing, which was a simple convenience to the manufacturer. He found that it was impossible to make a camera so exact that the focus should be true without there was a means of adjusting it. No workman could work so closely as to get the correct focus in the first instance; but, that once obtained, it was all right.--Some collodion having been handed to Mr. Cox, he coated one of the bent plates by holding one end of the segment much below the other end, which he held by the left-hand corner; he then poured the collodion along the edge of the lower end, and afterwards gradually reversed the position of the ends, allowing the collodion by gravitation to flow over the whole plate until it ran off the other end of the plate, which had thus become the lowest part; he then stated that the immersion in the bath and development would be conducted in precisely the same manner, and that there would be an advantage in the developing, because the surface would be wet and allow the development to flow with facility. He then proceeded to describe the camera and lens, and said the focus was 7½ inches, for which the glass was curved as for an object at 150 feet; he did not find at a distance of 150 feet (and that was as far as in a London atmosphere he had been enabled to obtain a focus) that with a ½-inch aperture there was any perceptible difference in the focus. Using the ¾-inch aperture, he did not find any perceptible difference in three-quarters of a mile. He had a lens with a stop giving an aperture of half an inch; and that he found would give a sharp definition at a distance of 40 feet and at a distance of a quarter of a mile. With a ½-inch stop and 7½-inch focus, from 40 feet to a quarter of a mile there was no difference in the focus of the lens. There were two fans placed in front of the central aperture; and the object was to shut out the oblique rays from the central aperture: thus, when the light was directly in front of the lens, it passed straight through, but when the light was at the side of the lens it went through the side, the fan cutting it off from the centre. If it were a plain circular hole, the centre of the picture would receive much more light, and become solarized before the margin. By using the fan-like stop, whether the principle be right or wrong, the effect is satisfactory.

Mr. Mayall said we had had a Comic English Grammar, a Comic English History, and now the photographic world was to be treated to a Comic Camera—a camera constructed upon principles which utterly ignored all focusing. He did not know whether Mr. Cox's explanation elucidated the subject; at all events, it was but the reproduction of a very old camera, invented in Paris by M. Martens in 1845, and which was made by M. Scheirtz. He (Mr. Mayall) then stayed in Paris for a long time for the purpose of purchasing the invention, provided it should be practicable. The difference between M. Martens's camera and the camera of Mr. Sutton was, that M. Martens's was made with an achromatic lens for the usual flat plate; however, M. Martens did succeed tolerably well at that time; and it may be remembered that then they had only daguerreotype plates; he attempted to make holders—to have something like a semicircle, in some measure to counteract the aberration of his lens, which he did to some extent successfully; he made his camera to turn on the axis of the combined focus and the plate to subtend the strongest portion of the light at the different parts; however, it never ended in being employed in more than some preliminary experiments worked out by a camera something like the one before the Meeting. There was no doubt that for some purposes that camera might be of considerable use; but for the working of collodion on glass it appeared to him to be of very little use to the photographic world, as he did not imagine any extraordinary definition could be obtained with that form of lens. He had not been able quite to follow the Secretary in reading the paper, and he did not know exactly the principle upon which it was founded. At all events, they ought not to ignore the labours of previous discoverers who had considerably aided the present workers; he saw Mr. Malone was present, and he had no doubt that he might recollect M. Martens's camera. About from 1847 to 1850 M. Martens was engaged with his panoramic camera, and M. Scheirtz made it; it was worth while to have that fact recorded. Then we had the liquid lenses made by Mr. Archer, and he remembered he had the pleasure of seeing Dr. Diamond working with one; therefore that part of the subject was not new. All that was new was the calculation of curves. He (Mr. Mayall) came to the Meeting expecting another kind of subject to be upon the *tapis*, which seemed to be quashed. It appeared to him that there had arisen in this country, as well as in others, since 1851, a system of reproducing the ideas of others; and while upon the subject, he would mention that there was an invention which went by the name of Woodward's Camera. In 1843, while he (Mr. Mayall) was in New York, Mr. Johnson, who was known in this country as a very clever daguerreotypist, bought and sold a reflecting camera, and had at that time a camera almost entirely the same in construction as the Woodward Solar Camera, so that he (Mr. Mayall) rose to express the desire that some of the early men should not be forgotten in these reproductions; and he thought that the Society should not lend its countenance and

influence in putting forward as new inventions what had been effectively done years ago.

Mr. MALONE was glad Mr. Mayall had spoken first in this matter; and he would, in confirmation, state that M. Martens's camera gave better results than the one produced to the Meeting. He (Mr. Malone) had looked with anxiety at the specimens; and he had noticed the self-sufficient style of the papers, which photographers had better disclaim, because, unless the pictures produced were better than the present, he could not expect that the Society, or any amateurs of distinction or otherwise, would take up an instrument which, by the results shown, yielded inferior things. As Mr. Mayall had said, the lens was corrected in M. Martens's case for focus, but here there was no focus worthy of the name. In M. Martens's camera there was a distinct focus to be obtained, and the lens, by traversing, had a peculiar diaphragm arranged behind a slit, so that, as the lens was turned towards one part of the view, the image passed through a slit and fell upon that part of the plate which was opposite the slit; then as the lens turned round the light fell upon the other parts of the plate, and the first parts were covered up; so that by these very ingenious arrangements that peculiar diaphragm gave you the means of getting a sharp picture throughout, which certainly appeared to be impossible by Mr. Sutton's arrangement. There was a little ingenuity in Mr. Sutton's arrangement, but the final result was inferior to that obtained by another method; and for that reason, as practical men, the Meeting could not for a moment entertain Mr. Sutton's camera, which was merely an ingenious contrivance which would have been applauded in the first days of photography, but which did not deserve any praise at present—at all events, not that flattering account which the author gave of it.

Mr. SHADBOLT came forward in a new character, *i. e.* a defender of Mr. Sutton: how he might have deserved it, was another question. He said he came forward as a defender, because he thought there were quite enough objections inherent in the apparatus before them without attributing objectionable matters to Mr. Sutton, which he did not claim. With regard to the subjects put forward by Mr. Mayall and Mr. Malone, they were really so extremely prolific in that direction that it would be difficult to answer them in one evening; therefore he would speak of the lens before them. He regretted especially that so many assertions had been made without any proofs being given. First of all he took a memorandum of Mr. Sutton's statement, to the effect that focusing with his lens was not necessary. He (Mr. Sh.) believed that any one who had paid the slightest attention to optical matters would at once see that the statement of focusing not being necessary, translated into plain language, meant that he *could not* focus at all with it. With regard to Mr. Mayall's observation, that no novelty was produced, he thought that was an error into which Mr. Mayall had fallen from not having examined the lens. It was dependent on this principle,—that a sphere of glass containing a sphere of distilled water could be so arranged that the two combined should be achromatized, and that consequently upon a spherical surface, and for a spherical surface only, it would have an absolute solar focus for objects at a long distance. Now, unfortunately, as the bulk of objects photographers have to delineate did not stand at a sufficiently long distance, the bulk of terrestrial objects were absolutely out of focus. But, again, it must be remarked that they had not in Mr. Sutton's case a sphere, but part of a cylinder, to work upon. The remarks made about ignoring focusing altogether, resolved themselves into the self-evident fact that the camera is not so adapted that you can obtain a focus. He very much regretted that the matter had not been more tangible than it appeared; for he confessed that some years since he believed a panoramic camera a possibility, in consequence of having seen that very camera of M. Martens. Mr. Malone stated that it was owing to the perfection of the lens that M. Martens was enabled to get a comparatively sharp picture; but he (Mr. Shadbolt) thought that that was an error, and that Mr. Sutton's lens would produce a picture as sharp as that of M. Martens, provided the plate could be arranged in the same way. M. Martens's plate did not describe a part of a circle, but an indefinite curve, and had an adjustment by which the daguerreotype plate could be accommodated to the focus of the part of the object immediately under inspection. He had a means of arrangement by which a part of the plate should be a little nearer to or more distant from the lens; and it was in consequence of that that he was enabled to get something approximating to a sharp picture all over. He (Mr. Sh.) had taken some pains to examine the negative from which the picture before the meeting was produced. The negative was in the possession of Mr. Cox.

Mr. Cox explained that that was another negative, but of the same subject.

Mr. SHADBOLT stated that on examining that negative he was prepared and expected and hoped to be able to admit that it was a tolerably sharp picture; but so far from that being the case, he only found about one-third even tolerably sharp, and two sides of the picture *absolutely out of focus*, as well as the foreground: there was absolutely no correction for spherical aberration, with the single exception of reduction of the aperture. The stop which had been exhibited was both a novelty and highly ingenious, and did certainly so adjust the light that the oblique rays were equal to the direct rays. Although Mr. Mayall had stated that there was nothing new, that was something which had really never been brought before the public; and he thought that Mr. Mayall would, upon examination, absolutely admit that the lens was new: but then the question was not only as to its novelty, but also as to its applicability. With regard to some of the objections to the camera, they must not criticise too closely the assertions made by Mr. Sutton, who evidently was not a man who looked *too unfavourably* towards his own project; and although he does occasionally, and perhaps unconsciously, use hyperbolical language, and say that pictures delineated upon flat surfaces produce hideous caricatures, and then goes on to argue that to take a correct perspective you must take it upon a curved surface, yet how does he prove that? He says that on taking a row of houses exactly identical with each other, but in the form of a crescent—taking them in his camera, afterwards printing them and spreading the print out flat, it would be mistaken for a straight-built row of houses. Had not Mr. Sutton obtained that idea from an article recently written by Mr. Grubb, in which he points that out, and more than that, viz. that in taking a picture of a long row of flat houses by means of a panoramic lens, you would have a plate when opened out with all the horizontal lines curved towards the extremities? It is quite clear that if we observe horizontal buildings, we do not see curved lines, but absolutely straight ones. That cannot be questioned; so, under such circumstances, Mr. Sutton asserts that before he can tell what he has got, he wants to inquire what lens it was taken by, which reminds one of the schoolboy who delineated something upon his slate and wrote beneath that something, "This is a house." With regard to the objections to the use of the lens, he thought the curved glass was itself alone the greatest drawback, as glasses could not always be obtained with the exact curve. With regard to the manipulatory details, they might be more troublesome; but if they produced better results, there were plenty of resolute men who would

successfully grapple with all manipulatory difficulties.

Mr. MALONE thought that Mr. Shadbolt was as facetious as the author of the paper, and that he gave up the points which he rose to defend. M. Martens's camera had at the back of the plate-holder a series of screws, by which he could adjust, almost at will, the daguerreotype plate. He focused with a slip of glass, focusing each part in succession, adjusting by the screws: thus he went on, and so he insured the focus over the whole plate; while Mr. Sutton utterly failed to get a focus, which could be clearly seen. He admitted the novelty in the diaphragm, and gave great praise to it; but M. Martens's camera was certainly the best.

Mr. HEATH complimented Mr. Shadboldt on the complete control of temper he had evinced in discussing this question, after the provocation he had received from the author of the paper. With respect to the camera, he (Mr. Heath) really did not see any advantage at all; and he looked at the curved glasses for the image, the curved printing-frame, and he was going to say, the roundabout way of accomplishing that which was best accomplished in the straightforward way, and which was the better way in all matters of life,—he looked at all these matters as decided disadvantages. Looking at the pictures exhibited, looking at the negative at the last Meeting, and recollecting Mr. Sutton's trumpet-notes heralding his production, he (Mr. Heath) was much struck with the complete want of definition. That Mr. Sutton had produced an ingenious thing was beyond all question; but no person could venture for a moment to compare it for efficiency with the ordinary apparatus now in general use.

Mr. HUGHES observed that there was one peculiarity of the camera which appeared to have escaped the notice of the gentlemen who had spoken of it. In testing its capabilities, one must put it through the various positions in which it is likely to be used. Landscapes were not invariably taken with a view to lateral effect; and lateral effect was the sole point for which Mr. Sutton intended the large angle: but in practice there was as much vertical effect as lateral requisite; and how was he to treat this camera with reference to vertical effect? If Mr. Sutton had abandoned the portion of a cylinder, and made his plate hemispherical, he would really have been consistent. Supposing he had to take a church with a spire, probably the camera would be hoisted at right angles; then what sort of a picture would be obtained? And yet, without that, which was the only way of getting over the difficulty, the spire would be *in nubibus*. Mr. Shadbolt had stated that, if the results were superior to those usually produced, the manipulatory details would be got over; but, looking at the pictures produced, he (Mr. Hughes) thought it very difficult to come to the conclusion that they ever could be superior; at present they were decidedly inferior. Purposely waiving the point altogether as to the superior definition, he would remark that we have had the curiosities of literature and the curiosities of science; when the curiosities of photography come to be considered, this camera must occupy a very distinguished place.

Mr. LE NEVE FOSTER had looked at the pictures, and ascertained the remarkable want of definition, although Mr. Sutton appeared to think that there was a great deal of definition. Mr. Sutton in his paper uses these words: "*I have never found the use of focusing in any view-lens*," which passage was incomprehensible. Mr. Sutton also says, "and I have worked for two years almost daily without altering the focus of my view-lens."

Mr. SEBASTIAN DAVIS thought Mr. Sutton must have meant his own lens. As far as focusing went, his lens would not admit of focusing, for it was supposed to take a picture from a mathematical point in the centre of his view, and to describe a circle round; and it was quite clear if he (Mr. S. Davis) took Mr. Shadbolt as a centre, and described a circle round him, it could only be regarded as radiating from one central point; therefore focusing would be out of the question.

Mr. MAYALL believed Sir Wm. Newton was not present; but this picture entirely coincided with Sir William's conditions: it would gratify those gentlemen who, up to the present time, do not admire sharp pictures, but who, like our former distinguished Vice-President, Sir Wm. Newton, are very fond of having only the central point sharp.

Mr. ELIOT did not know whether Mr. Sutton's other lens was in the room—the triplet, which was taken from Messrs. Ross's experiments some years ago, and proved by them to be a total failure.

Mr. COX thought there was some misunderstanding when gentlemen stated that there was no focus at all; for it would be remembered that he had stated that at a distance of about 30 or 40 feet to about a quarter of a mile there was no perceptible difference in the focus; and it could not be denied, if they took the cottage in a picture he now produced, that that cottage was sharp, and the distant object was sharp also, or he did not know what sharpness was. It would be understood that the picture was a developed print, not an albuminized picture. If they altered the focus of the lens, nothing would be sharp, because it acted upon the principle that from the centre of the lens to the centre of the plate there must be a given distance. The picture then in the hands of the Chairman proved what the lens would do; the first one was taken in the Christmas week, which was not precisely the weather for photography.

Mr. MALONE stated that it was not usual to reply after the final speaker to a question; but when he produced another picture, and argued upon it, he (Mr. M.) must ask to see it; and, after seeing it, he must be permitted to to state that there was a point in it of greater sharpness in the centre than the others possessed; but he maintained that the greater part of the picture was absolutely without definition, and the real question was, not whether any one point was defined, but whether the whole picture was good. The consequence was, that the picture, taken as a whole, was a failure, *and a decided failure*, as compared with Martens's. It was very detrimental to the cause of the lens to exhibit pictures such as were now under inspection.

The SECRETARY read the following paper:—

The Production of Photographic Images on Plates of Glass or Porcelain, by the action of Light, enabling them to be permanently fixed by being burnt in with Ceramic Colours. By JOHN WYARD*.

(Communicated by P. LE NEVE FOSTER, ESQ., V.P.)

THE plates of glass or porcelain, or other substance, on which the pictures are to be produced, may be glazed prior to the application of the sensitive mixture, or otherwise this glaze or flux may be carried over the finished picture before burning. The first preparation of the plates after cleaning consists in the

* The paper was accompanied with three specimen plates, which will be exhibited in the Exhibition of Inventions which is now open at the Society of Arts.

application of the following sensitive mixture.

I make separate solutions of gum arabic and gelatine :—

Gum arabic	....	72 grs.
Sat. sol. bichro. of potass.		½ oz. by measure.

Dissolve without heat.

Gelatine (Bell's)	......	15 grs.
Water	....	1 oz. by measure.
Sat. sol. bichromate	..	1 dr. by measure.

Dissolve in water-bath. When cool, add the sol. bichromate. Shake well and filter.

Take of the solution of

Gum arabic	....	11 parts.
Solution of gelatine	....	5 parts.
Water (distilled)	......	5 parts.

To every drachm of this mixture add 9 or 10 drops of honey syrup, formed by mixing equal parts in volume of honey and water, and filtering.

This mixture must be heated gently in a water-bath, well shaken, and filtered through fine muslin.

The substance on which the picture is to be produced—opal glass, porcelain, ordinary kelp, or plate glass—is slightly warmed by a fire, and a sufficient quantity of the above sensitive mixture poured on, in the same manner as collodion, drained off, and gradually dried before a fire. The film must be very even. A vigorous positive picture, either from collodion negative, paper, or albumen, or even an engraving, must be placed in contact with the sensitive surface, and the whole exposed to light—sunlight if possible. The exact amount of exposure is a matter of great importance; from six to ten minutes in good sunshine is in most cases sufficient.

When removed from the light, a negative image should be visible, the action of the light darkening and hardening the sensitive layer to a much greater degree when using the above mixture than when using plain gelatine. The sunned parts are harder, and the unsunned softer, than is the case with gelatine alone; The advantage I take of this hardening effect of light on the film of the above will be apparent in the next stage of the process.

I produce a positive image in ceramic colour on the plate. This is effected by carrying over the surface of the plate the colour in a fine state of division, by means of a pad of cotton wool, well charged with the required colour. Its successful application requires some experience. The surface of the plate should be beaten gently and equally—not rubbed. The cotton should be occasionally breathed on, and re-charged with colour. The colour will be found gradually to adhere to the unsunned parts of the film, and its application should be continued until the picture is considered sufficiently powerful. Almost any amount of vigour may be obtained.

The picture is produced by the parts not exposed to light taking the colour, and those portions exposed refusing to take it. The original negative image will now be almost lost to appearance by the superior density of the applied colour, forming the positive picture; but there remains in the sensitive coating the changed and unchanged bichromate, which it is necessary to remove.

To effect this, I apply alcohol to which has been added dilute acid in the proportion of 6 drops of the dilute acid to the drachm of alcohol.

The dilute acid contains 5 grains ordinary nitric acid to the drachm of water. A bath of this may be used, or, if the subject is on a flat surface, the liquid can be poured on. While on the plate, evaporation of the alcohol takes place: this would be equivalent to adding too much dilute acid to the alcohol, which would damage the film; therefore, in pouring on and off the liquid, care must be taken to keep up the proportion by adding a little pure alcohol occasionally.

When the brown colour of the changed bichromate disappears the acid spirit must be poured off, and pure alcohol poured on and off; this must be repeated once or twice with fresh quantities, it being necessary to remove every trace of the acid and water.

The picture must be dried very rapidly, and is now ready for burning, provided the recipient has been previously covered with a flux or glaze; if not, the flux may be applied over the picture in the following manner :—

Pour on a solution of Canada balsam in spirits of turpentine. Dry the plate by heat until the turpentine is entirely evaporated.

Prepare the flux, which may consist of borax and glass, or borax, glass, and lead, by grinding it on a slab with water, and drying. Apply this (the flux) equally and evenly, by means of a pad of cotton tied up in very soft and flexible leather.

With respect to the colours used, they are ground on a slab with water, and dried.

The red picture is obtained by peroxide of iron, prepared by calcining the sulphate, and washing the mass with successive portions of boiling water,—the dark brown by oxide of manganese.

Mr. Mayall thought he could add some information upon the subject. Having been engaged, about the year 1850, upon the subject of transfer, after the collodion

was invented, he went to see his friend Dr. Diamond, who was at that time developing his pictures with the protonitrate of iron with great metallic lustre, and the idea struck him (Mr. M.) that if they could be transferred to cameos in a simple form, they would be extremely valuable; he set to work to try to transfer to porcelain or glass, and procured some soft glass for the purpose, and produced some twelve or fourteen portraits—at least, they were copies of a bust of the Queen and Prince Albert, of various sizes. He washed over the surface of the collodion with a weak solution of gum, and then pressed down the enamelled glass upon the gum, and let them stay in contact for a short time; he then dragged the two apart, and in that way transported the collodion upon the piece of glass, which was made expressly so that with a very slight heating in the muffle-furnace it would melt in; he then placed a very thin film of glass upon it, and passed it into the muffle-furnace: sometimes it melted the whole thing down into the glass, and sometimes he lost the image entirely; but when the process was carefully done, the image of the photograph was melted in between the very thin glass over it and the very soft ductile glass under it, and thus rendered impervious to the atmosphere and to scratching, and then it could be acted upon as with the pictures now produced. He knew that there were now in the possession of Her Majesty a number of pictures that he did at that time. Then a M. Bulot, having heard that he (Mr. M.) had made some experiments, came over from Paris and waited upon him (Mr. M.); he had been trying experiments with collodion excited by the iodide and bromide of cadmium. He also had an interview in London with Mr. Minton of the Potteries on the subject, with the intention of transferring copies of the old masters on vases and on plates, and a number of things of that kind; however, they were very busy and he was similarly situated, and it came to nothing. He believed M. Bulot took out a patent for a process which he introduced to this country, but he was obliged to make some arrangement with him (Mr. M.), as he had done the same thing before, and he was to have had some benefit. However, the process ended in nothing. It was quite as well that it should be known that processes of that kind were to be done; and it was astonishing what an extraordinary heat even positive collodion will stand in the ordinary muffle-furnace; and if it were covered with a thin glass containing a large amount of lead, an ordinary photograph would produce almost the appearance of enamel. He was quite sure there was great value in the process, and hoped some gentleman would carry it out. He thought M. Bulot's patent was in 1851 or 1852. If he had been aware of the paper being read, he would have brought a handful of specimens.

M. Joubert had listened with great pleasure to what had been said. He was now engaged upon a patent process for burning photographs into glass and china in colours. Mr. Mayall's statements were interesting, but they only related to *one* colour. M. Bulot's patent could not come to any good, because he had not found out the means of applying different colours, which of course can only be obtained by processes different from the collodion process. His (M. J.'s) process was only recently patented, and not specified; therefore he would ask to be excused if he did not divulge it; but he would say that he did not use any collodion at all. It was a very different mode altogether—it was as it were grafted upon another process, by means of which he was under a promise to the Society, which he regretted to say had not yet been fulfilled, of presenting to the Society a number of specimens. There had been some difficulty in the *mechanical* part of the manipulation, which had been kindly alluded to in the last Number of the 'Journal;' but he had done some even that very day, and had been engaged upon it constantly. He had been in great hopes that the print would be issued in April, but would confidently say that they would come in in May. [He then exhibited two specimens of his new process, which were very beautifully burnt in, without any gloss above the surface.]

Mr. Mayall had forgotten to say, that not only did he produce them with a variety of colours, but with a variety of backgrounds. An ordinary photograph fixed upon a rich ruby glass gave a very beautiful effect; he ground some specimens of twelve or fourteen kinds of coloured glass into impalpable powder, and with the impalpable powder he coloured the portraits, and then put the thin film upon them and passed them into the furnace. Very extraordinary results were obtained; for, in some cases, where the cheeks were put in red they came out green, and in other cases blue, by some strange property in the silicate. It was extremely uncertain whether a lady put in most beautifully did not come out a greenamoor or a blackamoor, though it did sometimes happen that the ground glass came out the same colours as were put in. If any gentleman of sufficient standing as a scientific man will seriously take up the subject, Mr. Mayall will give him every assistance. There was something more in it than was at present fancied, and there was no doubt the silicates of some of the metals must be used in the shape of pigments, and perhaps they ought to be slightly more fusible than the glass itself. Without knowing anything of M. Joubert's process, he would suggest the use of the more easily fused silicates for the higher lights, the less fusible for the middle tints, and still less fusible for shadows. He was very glad that something had come before the Society. Gentlemen must be very careful in steering clear of a patent already in existence, although he thought M. Bulot's was about to expire. By using silicates for pigments, a variety of colours would be produced highly interesting to the ceramic art.

Mr. Malone asked Mr. Mayall to pardon him for reminding him (Mr. Mayall) that he (Mr. Malone) was the first person that ever attempted to burn photographs into materials.

Mr. Mayall begged Mr. Malone's pardon, and recollected seeing his specification.

Mr. Malone stated, with regard to heating a picture, that it was found that silver pictures, when in contact with substances with which they combine, gave a faint or feeble picture; it was also very clear that if chromium and colouring metals of that kind were used instead of silver, there would be no difficulty in procuring an intense picture. His object had been to make negatives upon porcelain, and it would be seen that if it could be done upon porcelain it could be done more easily upon glass, because in that, there is a silicate of potash or soda more easily combined. If a salt of chromium were used instead of a salt of silver, a red picture would be produced—but nobody would look at their portrait entirely in red; moreover, the portraits in chromium do not yield equal delicacy with those of the silver process. Long since, pictures by means of chromium salt had been produced in Paris. His experiments were interrupted by not being able to get porcelain into thin slabs; he spent some days at Mr Minton's, vainly endeavouring to get him to procure some thin slabs of porcelain by means of his hydraulic pressing apparatus. Mr. Minton was so busy at the time, making the compressed tiles, that he could not take the matter up, saying he did not think it was feasible, and endeavoured to discourage him; but he did not give it up, but went to Sèvres, and, strange enough, there met Mr. Minton, who recognized him. Mr. Minton, guessing the object of his visit, said,

"Oh! Mr. Malone wants to produce photographic portraits on porcelain; but it cannot be done!" M. Ebelmen had previously privately said it could, and offered to place the Government establishment of Sèvres at his (Mr. Malone's) disposal for experiments. He mentioned this to show there was something to be done. If it were asked why it was not done, it would have to be remembered that at about that time there were political changes in France, and M. Ebelmen died, and Mr. Minton was since dead, and that was the reason the experiments had for a time ceased. The first thing was to form the biscuit porcelain, translucent and yet retaining porosity, so that a metallic solution could penetrate it. The silver picture is so faint that recourse must be had to chromium, manganese, &c., and then the picture is not so delicate; still it was quite clear that good rough pictures could be at once burnt into thin slabs of porcelain. My proposition was to take a solid slab of perfectly homogeneous porcelain and then to saw that slab through. M. Ebelmen said it was practical; Mr. Minton said it was not—that it would be full of holes and flaws; and so it was—at least, that which was made in this country. As Mr. Mayall was anxious that merit should go where it was due, he (Mr. Malone), when seeking for a small share, could not be asking for more than his due.

M. Joubert remarked that what had been said by Messrs. Mayall and Malone only showed that for a number of years attempts had been made to transfer photographs, but that no one had ever touched the subject of doing them in different colours, except as photography can produce them, and for this reason, that it is only recently that the means have been found of using any given colour, and this is the very medium for which he (M. J.) had taken out his patent; it is for transferring them in any colour, or with two or three or more colours in any picture, which no photographer has attempted to do: the process which Mr. Mayall has described could only produce one colour—and that the colour of the photograph.

A Visitor observed,—Mr. Malone said it was necessary to have tiles of this very complicated manufacture. He (the speaker) had had the pleasure of seeing, lately, very beautiful specimens of M. Joubert's burned into the common glazed Minton tile, quite perfect in form and colour—in red, yellow, brown, green; and indeed there was no limit to the colour, which was the great desideratum of the present day. The burning was perfectly genuine, and there was no attempt at putting a film upon it.

Mr. Malone said that he was then speaking of translucent tiles, while the last speaker was alluding only to opaque tiles.

The Chairman read a paper which had been placed in his hands, which stated that Mr. Davenport was the first who proposed the use of porcelain instead of paper, and for which he procured a premium in 1849 from the Society of Arts.

Mr. Davenport rose, and stated that the circumstances under which it occurred would probably be brought to Mr. Malone's memory by the fact that in about 1849 he (Mr. Malone) was making experiments in the manufacture of paper (he believed at Maidstone), with a view to getting rid of the irregularities on the surface of the paper. At that time he (Mr. D.) and Mr. Malone frequently met, and exhibitions of manufactured articles were being held at the Society of Arts, and among the articles exhibited were a number of beautiful biscuit figures in china or porcelain, and it occurred to him (Mr. D.) that if the biscuit body could absorb a certain portion of chemicals instead of into the paper, a perfectly flat surface would be obtained to print through; and Mr. Malone would remember that, conjointly with him, they drew up a paper, which was recorded at the Society of Arts. He (Mr. D.) did not wish to detract from Mr. Malone's experiments.

Mr. Malone said that, after this direct appeal to his memory, he must say that he had completely forgotten any such circumstance, though if Mr. Davenport's memory be correct, still he (Mr. Malone) was the first who attempted to carry it out. He by no means contradicted Mr. Davenport without looking at memoranda and dates, but there was the fact that no one had done anything of the sort or proposed anything of the sort previous to his experiments made in London in conjunction with a small biscuit figure maker.

Mr. Manley exhibited a capacious expanding camera of his own invention, and which he called a Telescope Camera, in consequence of the length produced by the shelling out of body after body. It also had a peculiarity in the focusing-glass, which could not be detached from the camera, and was always out of sight, except when in use for focusing. The different portions of the camera were made to extend by a very well manufactured screw.

Mr. Mayall exhibited two very beautifully executed portraits of the Prince Alfred, to show the qualities of the peculiar collodion which he had advocated the use of on a previous occasion.

The thanks of the Society were tendered to the several gentlemen who had brought objects and information to the Meeting; and the Chairman announced that the next Meeting of the Society would be held in King's College, when the President would take the Chair.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

Ordinary Meeting, 13th March, 1860.

Sir David Brewster, President, in the Chair.

The Minutes of the preceding Meeting were read and approved.

The following gentlemen were elected Ordinary Members:—Mr. P. Stewart, Mr. R. Cowan, Mr. R. Romanes, Mr. W. Younger, and Mr. J. L'Amy.

The following communication was read:—

On Printing Photographic Pictures from several Negatives. By Henry P. Robinson.

(Read March 13, 1860.)

Rather more than two thousand years ago, Zeuxis of Heraclea painted his famous picture of Helena for the people of Crotona, in the composition of which he selected, from five of the most beautiful girls the town could produce, whatever he observed nature had formed most perfect in each, and united them all in one single figure. A reference to the dim traditions of antiquity might perhaps be considered out of date in treating on an art which was discovered only a few years since; but the purpose of the paper I am about to read this

evening is to induce you to do in photography something similar to that which the old Greek did in painting, that is, to take the best and most beautiful parts you can obtain suitable for your picture, and join them together into one perfect whole.

I have frequently been requested to give some information on the method I employ in producing photographic prints from two or more negatives; the plan is so simple that I have never before thought it worthy of a written description; however, I have now prepared a few prints, the inspection of which will enable you to understand how these pictures are produced.

It has often been remarked, that an artist who would attempt this kind of work must have very great advantages over other photographers; that he must have time to hunt after the scenes of his pictures; that it is a matter of chance in finding bits of landscape scenery to suit his figures; also, that few people would take the trouble to carry their models and accessories into the country for the sake of one or two pictures, and the possibility of securing none, as models are sometimes refractory and difficult to arrange. But the truth is, that a great variety of appropriate scenes for figure subjects might be formed on a small piece of ground: the principal parts of most of my photographs, containing figures and landscapes combined, were taken in a small back yard, about 50 feet long by 20 feet wide. In this I have thrown up a bank, and partly covered it with wild flowers and ferns; the other part consists of an imitation of a mountain spring, covered with honeysuckle, brambles, &c. With this arrangement I can get a foreground for almost any variety of landscape: a heath scene, or the top of a mountain, as in "Nearing Home;" or the side of a river, as in "Here they come" and "Preparing to cross the Brook;" or part of a wheat-field, as in "Lavinia." At the foot of the bank is a hole, caused by the removal of the earth to make the bank; into this runs the waste water from a print-washing apparatus which forms a river. In this confined space, with the assistance of a spade and a little ingenuity, a great variety of effects might be produced.

Perhaps the best method of describing double printing will be to take a very simple subject first—although it cannot strictly be called a double print, as only one negative was used. In the picture I have named "Here they come," and for which your Society has honoured me with the silver medal, the two figures were placed in position on the bank I have described, and a negative taken of them. At the top of the bank was a brick wall; this was objectionable, and had to be removed from the picture; to do which, a print was taken of the plate, but neither toned nor fixed, the figures and bank carefully cut out, and the remaining portion of the paper neatly pasted on the negative. Another print was then taken, in which the sky appeared too white; therefore the print was laid on a board, the figures and bank covered exactly with the impression from which the sky had been cut, a clean glass placed over the whole, and the board was carried into the light and the sky graduated down. This proceeding is very simple, and I have no doubt is known to you all, but it will better enable me to describe that which is to follow.

The next step is to add a landscape to a figure, of which "Lavinia" and "Nearing Home" are examples. The same bank has been employed for the figures in these pictures as in "Here they come," but instead of a graduated sky, a landscape has been introduced: this is accomplished by taking a landscape negative to suit the subject (which should not be of too important a view to overpower the figures, but should rather serve to throw them out in relief), and, cutting out so much of the figure and foreground as will come before the distant view, paste it on the landscape negative: when the negative is printed, it will leave the place for the figures and foreground plain paper; if the figure negative is now covered over so as to print only in the places which are left for it, the picture will be complete.

At first sight it will appear difficult to place the partly printed pictures in the proper place on the corresponding negative. There are many ways of doing this, and any of which might be chosen to suit the subject: sometimes a needle might be run through some part of the print—for instance, in the angles formed by the joining of the bank to the figure,—and the point being allowed to rest on the corresponding part of the second negative, the print will then fall in its place at that point: some other point has then to be found at a distance from the first; this might be done by turning up the paper to any known mark on the negative, and allowing it to fall on it: if two points, separate from each other, are on the right place, all the others must be correct. The printing-frame can then be closed, and placed in the light to print. This operation is easily performed after a little practice; in fact, all my composition pictures are printed by boys.

Another way of joining the negatives is by placing a candle or lamp under the glass of the printing-frame, and throwing a light through the negative and prepared paper; the joining can then be seen and easily adjusted.

These methods can be applied to any number

of negatives forming one picture. I exhibit a print of "Fading Away," which was printed from five negatives; the joinings are purposely widened to show how they are combined; you will observe that the composition was so arranged that the divisions occupy unimportant places, easily hidden. This was the first picture I ever composed in photography: of course there are many faults in it, which would not appear so conspicuously if I attempted the subject again. I am sorry to say that the negatives, after giving about two hundred impressions, were injured by damp, through the carelessness of an assistant.

It is sometimes necessary to print a single figure from two negatives: "Ophelia" is an example of this kind. The head was taken from one model, and the figure from another; the print exhibited will show how this is managed: you will here notice that the edges of the two negatives are shaded off, and allowed to fall over each other.

The mechanical difficulties in this kind of work are nothing—amateurs of small experience might conquer them with a little practice; the great difficulty is the choice of a subject, the selection of models, and the drilling of them into their work. The principal figure in "Fading Away" had three years' practice in expression for photography before a satisfactory picture was taken.

It is rather singular that so little has been done in this branch of photography. The method has been practised for many years by the gentleman who first brought it into successful practice, Mr. Rejlander; his pictures have been prominently before the public for some years; but I do not know of any one, except myself, who has attempted to imitate him. It cannot be that we have no artists among us; we cannot all be so devoted to science that we discard art; our exhibitions give good evidence that there are men practising our profession who can group figures together. It is possible that prints from several negatives combined do not pay so well commercially as proofs from a single glass; but that should not prevent enthusiastic followers of such a pleasing art from pushing it to its greatest extent; and its application to the highest art-purposes is certain. But art is thoughtful work for earnest men, and until a photographer devotes his time entirely to a few good pictures each year, we shall never know what artistic effects can be produced. There are other causes which tend to stay the progress of art in photography. Some critics, even in journals which we might expect to encourage any efforts to advance art, have endeavoured to put down the attempts (failures they might be, but they are well meant) of the few who try to get out of the beaten track,—the old "Portrait of a Gentleman," or "Landscape *without* figures," so continually recurring in our exhibitions; they are not content with the condemnation of individual efforts (which would be only fair criticism), but their disapprobation extends to the whole system; one even goes so far as to express not only his *indifference*, but his *dislike* to all attempts to make figure-pieces. It is not the fault of photography that the man has not yet appeared who will make the best use of the abundant materials provided for him.

It has been said that the possession of a good model is a lucky accident; but that is far from being the case. Art can be extracted out of almost anything. A Hunt, inspired by a Ruskin, can make a picture from an oyster-shell. Take any model, find a suitable subject for it, (and here is an occasion to exhibit the *art* that has been denied to photography; for a subject must be imagined, and imagination is art,) and instruct it well in its position and expression. Do not be discouraged by one failure or a dozen; fix in your mind the idea you mean to express, and persevere until it is represented. It will be found that the less models know of photography, the better. Actors are always bad models; they know so much, and allow the operator to know so little, that the result is not an artistic picture, but a theatrical study.

I am not before you tonight to preach the crusade of Art in photography; I have long expected abler men to do that. Every meeting produces speakers on lenses and cameras and processes, but very little is said about the application of these necessary instruments and discoveries. I think we are now as perfect as possible in manipulation—as far as black and white are concerned. We want to apply these discoveries to higher purposes than we have hitherto done. The means of producing pictures in our art are as good as those of producing paintings in Raphael's time, and nothing but a deep and earnest study is required to make our pictures rank with the works of the most famous men.

The thanks of the Society were awarded to Mr. Robinson for his paper, and also for the collection of photographs in illustration of it, which he had presented to the Society.

Mr. Macnair gave an account of the Dry Collodion Process briefly noticed by him at the Meeting in January, with the result of further experiments in preparing the plates, illustrated by views taken of the process. (See p. 204.)

Account of a New Dry Collodion Process. By Mr. John Macnair.

(Read 13th March, 1860.)

At our Meeting in January last, I mentioned that I had succeeded in preserving sensitive collodion plates by washing off the free nitrate of silver, and then applying a solution of malt. Further experiments with this process have satisfied me as to its value; and I now beg to lay before you such exact details of the process as those experiments have enabled me to fix.

For making the infusion of malt, I use a common earthenware teapot, which holds about a quart and a half, and which before being used is well warmed with hot water.

Mix 7 ozs. of well-bruised or ground pale malt in about 24 ozs. of hot water, so that the mixture, after being well stirred, will be at the temperature of 155° to 158°; if the heat be higher or lower, cool or raise it rapidly to 155° to 158°. Place the teapot containing the infusion before a moderate fire for about half an hour, when the heat will have fallen to about 138°, and the infusion has acquired a sweetish, but not luscious taste. It may then be removed a little further from the fire to cool slowly for two or three hours, and frequently well stirred during that time, and then filtered, when it should be quite fluid, bright, and of the colour of very pale sherry. For larger or smaller quantities use the same proportions of malt and water.

Roughen the glass plates well at the edges on a flat stone—not with a file,—and use a fluid collodion that will adhere well, pouring it on carefully to the edges of the plate; excite in a neutral bath of 35 grains nitrate of silver per ounce of water; wash off all the free nitrate of silver at a tap, or with a jug, finishing with distilled water. The free nitrate will have been got rid of when the greasy appearance which the plate has when the water is first applied is entirely removed; the plate will then be sufficiently washed. Rest the plate for a few seconds on blotting-paper, and before it begins to dry, pour over the malt infusion in the same way as the collodion; wipe the back of the plate, and then dry (the quicker the better) either before a dull fire without flame, or better, and to avoid dust, place the plates in a box before the fire, ranging them in a slanting position, with the end from which the collodion and preservative coating were poured uppermost, and the coated side inwards. A hot-water foot-pan, or a couple of hot fire-bricks placed on a slate in the box, will greatly accelerate the drying of the plates.

The time of exposure for taking views may be reckoned the same as with wet collodion; and for copying from a negative by contact, from one to three seconds will suffice,

After exposure, wash off the preservative coating, letting the water flow from the centre of the plate towards the edges; then, using a plate-holder, dip the face of the plate in a solution of nitrate of silver, or in the bath; but for this purpose it is better to have a separate bath, and one of 20 to 25 grains nitrate of silver per ounce is strong enough. Develope with

Protosulphate of iron ..	20 to 30 grs.
Glacial acetic acid	½ drachm.
Alcohol.................	½ drachm.
Water	1 ounce.

If more intensity is wanted, wash, and continue the development with

Pyrogallic acid	2 grains,
Glacial acetic acid..........	½ drachm,
Alcohol	½ drachm,
Water	1 ounce,

adding a few drops from the nitrate of silver bath.

After fixing, bichloride of mercury, ammonia, hyposulphite of soda, or any of the other agents, may be used to alter the tone or give more density.

An equally certain preservative may be made by infusing coarse Turkish barley, or rye, or Indian corn meal, adding about an eighth part of ground malt: either of these will make a firmer coating than the malt solution, but which requires a little more careful washing off. The infusion of barley should be made at a temperature of about 145°, and the Indian corn about 150°.

By this process, pictures, prints, &c., can be copied in the camera, and negatives also printed by contact, with ordinary gaslight, which I am not aware can be done satisfactorily by any other dry process.

Mons. Orange, in exhibiting a collection of stereograph negatives and prints taken by the process which Mr. Macnair had just described, said that he had now employed it to a considerable extent, and was satisfied that it possessed very great advantages. He had not had an opportunity of testing its keeping powers thoroughly; but plates which had been prepared several weeks before they were exposed, he had found to be perfectly good. The exposure required was very much less than with any other dry process; indeed, he was inclined to believe that this process was very nearly as sensitive as the wet collodion process itself. He had taken some excellent views with it in three or four seconds, in fair light. He was now purposing to use these dry plates very extensively for stereographs, as well as for larger-sized pic-

tures, and he might add that he had never found the slightest difficulty in preparing the malt-solution. It must be borne in mind, however, that the solution does not keep good for more than a few days; and he might also mention that the plates should be particularly well cleaned, and likewise carefully washed to remove the coating.

Mr. Walker said that, as far as he could judge from the few trials which he had made of this process, he was inclined to believe that it would supersede all other dry processes, chiefly on account of its great simplicity and its remarkable sensitiveness. The other day he had taken a few prepared plates with him into the country, and had exposed them for the same length of time that he would have given for wet collodion. Of each view he took a duplicate exposed for exactly the same time. The duplicates he sent to M. Orange to develope; and the Society had just seen how completely successful they had proved. His own set had not come out so well, as, from his not having any pyrogallic acid with which to complete the development, he had not been able to bring them up to the full intensity required to print from. When properly developed, the blacks were unusually intense, and the skies never needed to be painted out, as is so often the case with other processes. Indeed, in every part of this process, the ease and certainty with which the results are attained is very remarkable, and will lead, he was convinced, to its adoption in preference to all other dry processes.

Dr. Paterson said that, since he had described his gum process at the recent Meeting of the Society, he had tried the process now brought forward by Mr. Macnair; and he had no hesitation in saying that the latter was by far the better of the two. A great advantage possessed by it appeared to him to consist in the tenuity of the preservative fluid, which admitted of its easy application to the plate. The surface of the plate itself, too, appeared to be preserved for the future development in a condition more nearly approaching that of a wet-collodion plate than in any other dry process, and hence the rapidity with which the impression is produced and the subsequent development effected. There seemed to him, however, to be some uncertainty at present in preparing the malt solution of an unvarying strength, such as would produce a uniform result. Sometimes there was too little, and sometimes there was too much sugar in the solution; and he thought it would be very desirable to ascertain what was the best mode of preparing the solution, and then what was the exact composition of the solution so prepared.

Mr. Nichol said that in experimenting with this process he had, by a slight variation in the preparation, obtained two samples of the malt solution differing from each other essentially. One was a fine, thin, free-flowing liquid, which hardened on the plate into a dry skin, like varnish, and withstood hard rubbing. The other gave a sticky coating, which never hardened even at a temperature of 120°. In the camera, the plates coated with these two solutions gave equally good results; but of course he need not say that in practice the latter solution was very objectionable from its liability to attract particles of dust, &c. He had also tried coating plates with a solution composed of the known constituents of the malt solution, and in the proportion in which they are understood to exist in it; but he did not find the results at all equal to those obtained with the malt solution itself.

The President afterwards directed attention to several small Photographic portraits which he exhibited, and stated to be produced instantaneously by Mr. Skaife, of Blackheath, by his new apparatus, which he calls a Pistolgraph.

After examining them, the Meeting separated.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

The 23rd Ordinary Meeting of this Society was held on Monday, March 19th, at the Golf Club House, the President, J. Glaisher, Esq., F.R.S., in the Chair.

The Minutes of the last Meeting having been read and confirmed,

Mr. Charles J. Busk proceeded to read a paper:—

On the Reproduction of Engravings, Prints, Ordinary Writings, or Letterpress, on Prepared Papers, by contact in the Dark.

The pictures shown this evening are the result of a process I discovered about twenty years since, by which engravings, prints, letterpress, or writings with common inks, may be copied on prepared paper by contact in the dark. The image, at first invisible, will be developed as a negative by holding the paper by itself for a short time in bright sunlight: a few seconds will suffice in some instances, but a longer exposure is necessary when the sun is not bright. I am unable to fix with minute accuracy the date of this discovery, but it was about the year 1840. I was then residing at the Cape of Good Hope, and in the course of that year used occasionally to prepare papers with salt and nitrate of silver, according to formulas given in some of the periodicals of that time, for the purpose of copying leaves

of plants, &c. This was done overnight, and the papers were then placed between the leaves of books, to preserve them till the morning.

On one occasion, in order to vary the experiments and try something new, I steeped the paper in a solution of tartaric acid (about a teaspoonful in a tumbler of water) instead of the salt solution, and after being dried it was immersed in a solution of nitrate of silver, 60 grains to the ounce of water, again dried, and placed as usual in a book. On exposing it next morning in a bright sunlight, instead of an image of the object placed on it to be copied, I was greatly surprised to see a totally different picture appear as if by magic.

Ultimately, on reference to the book in which the paper had lain during the night, I found I had obtained a negative copy of the picture it had been in contact with. Struck by the singularity and unexpected result of this my earliest original experiment in photography, I prepared other papers in a similar manner, and was equally successful with them. I recollect one in particular: on a half-sheet of foolscap I obtained a very distinct copy of the "Warwick Vase," from an engraving in the 'Saturday Magazine' (I think it was called), a periodical of that day. The copy was very clear and well defined, and of a tolerably dark reddish slate-colour. This picture was shown to many persons, and was in existence for some months: what at last became of it I do not know. It was not fixed otherwise than by simple washing in cold water, and did not seem to lose distinctness during the time I recollect it.

Only practising photography as an occasional amusement in this most simple way, it did not occur to me to take any steps to bring the matter to the knowledge of scientific persons, and in the course of a short time I ceased to make further experiments, but not till I had ascertained that oxalic, citric, and some other acids produced similar effects.

Since I have been in England during the last ten or twelve years, the experiment has been only occasionally spoken of, and a few repetitions made with tartaric acid to show the effects. Within the last month, however, I have been urged by our President (Mr. Glaisher) and Mr. Heisch, a member of this Society, to bring this discovery to public notice, as it might probably be made available for some useful purpose.

The experiments I have made of late, though still incomplete, show very interesting and satisfactory results, and I hope others may feel inclined to investigate the subject also, with a view of eventually bringing it into practical use. From what I have done, I think it very probable that negatives can be produced that will allow good positives to be printed from them.

Until lately I imagined that an organic acid was a requisite ingredient to use in preparing the papers, for my earlier trials with inorganic acids were not successful; but more careful experiments of late show that this is not the case. So far as I have used them, they answer equally well; and I have also found that paper dipped in a solution of nitrate of silver alone will, after a few hours' contact with an engraving or print, give a faint image in a bright sunlight (probably in consequence of a little free acid in the nitrate of silver solution); and even if the image should not appear after a few minutes' exposure, it can be developed by pyrogallic acid (1 grain to the ounce of water), with a few drops of nitrate of silver added; but the effect thus produced is different to that when it is developed by sunlight alone. The image comes out of a different shade of colour to the rest of the paper, and changes to a white metallic lustre, whilst the ground turns to a dense black.

In order to produce good effects with distinct white, it is requisite (and this is the main feature of my process) to steep the paper in an acid solution. Different acids give slight differences in the clearness of the whites; glacial acetic acid I have found to produce the very best whites, and it also ensures uniformity of colour on the dark parts.

The twenty-six pictures measuring six inches by eight, before you, are the best I have been able to make within the last few days: the weather has not been particularly favourable for developing the image. Each picture has attached to it the formula according to which the paper was prepared; and they were nine hours in contact with the engravings, &c. to be copied,—not, be it understood, that such a length of time is requisite, but simply because it was convenient to prepare the papers overnight and leave them on the engravings till the morning. Half an hour, or one hour, is long enough. I have obtained a picture after five minutes' contact, and which, after contact, but before exposure to sunlight, was placed between sheets of blank white paper for a day and a half; it then developed as perfectly as those longer in contact and exposed to sunlight at once. Two of the specimens on the table, marked S.P. 111 and 112, were nine hours in contact, and then twenty hours between blank papers. No difference of distinctness of image or clearness of whites can be distinguished between them and the others. They and many of the other pictures have been taken from engravings in the 'Art-Union Journal,' representing articles at the Exhibition

of 1851. One is from a coloured example of Minton tiles, in the September Number of that year, and shows the curious effects of different colours, blues producing yellows, and reds and yellows producing whites more or less clear; others from engravings and letter-press in different books; there are specimens from manuscript writing of the year 1845, and one from a machine-pressed copy of a letter written the 6th June, 1848. It is not at all necessary to expose to sun- or day-light any of the prints or writings, or other designs to be copied, before putting the prepared papers in contact with them. A design that has not seen daylight for years can be taken equally well, and in as short a time. Some of these pictures are on Turner's negative paper; some on Saxe-paper, both negative and positive. Some of the papers have a distinct picture on either side; some on one side only, intended for use as negatives to print from,—the white back being obtained by placing a piece of black transfer paper in contact with it. A long exposure to the sunlight has not had the least deteriorating influence on the whiteness when glacial acetic acid has been used in the nitrate of silver solution, and applied on both sides of the paper.

This change, produced in the papers by their merely having been in contact for a short time with black and some other colours, which prevent discolouration on exposure to sunlight, is exceedingly curious; perhaps some one more experienced than myself in photographic chemistry may be able to explain the nature of the chemical action that produces this singular result. The papers have been nearly all wetted on both sides with the two solutions used in preparing them. The proportions of the ingredients used have been varied for experimental purposes. The acidifying solution in which the paper is first steeped has been, for some of them, eighty grains of tartaric acid by itself to one ounce of water; for some, eighty grains of tartaric acid with one drachm of glacial acetic acid added; for some, twenty grains of tartaric acid and half a drachm of glacial acetic acid; for some, fifty grains of tartaric acid alone, and for others, one ounce of glacial acetic acid by measure in two ounces of water, and no tartaric acid. For the sensitizing or nitrate of silver solution, I have used, for some, fifty grains of nitrate of silver, for some, sixty grains, and for others ninety grains to the ounce of water; for some, the above proportions of nitrate of silver alone, and for others, in combination with glacial acetic acid, from half a drachm to one drachm in the above proportion of nitrate of silver in an ounce of water. The various proportions give slightly different shades of colour to the negatives, and the shade of colour is also somewhat affected by the nature of the size in the paper,—those sized with gelatine being rather redder than those sized with starch. Of the various mixtures I have used, I am inclined to think the following proportions will give the best results, and should be applied to both sides of the papers:—

For the first or acid bath, 80 grains of tartaric acid to an ounce of water; the paper to be immersed for a short time and then dried by moderate heat; then well wetted on both sides or immersed in a solution of nitrate of silver, 50 grains to the ounce of water (or not more than 60 grs. at most), to which half a drachm or one drachm of glacial acetic acid has been added. Or the acidifying solution may be 20 grains of tartaric, with half a drachm of glacial acetic acid to the ounce of water, or one ounce of liquid glacial acetic acid mixed with from two to three ounces of water,—the sensitizing or nitrate-of-silver solution being, as above mentioned, 50 to 60 grains to the ounce, with a drachm of glacial acetic acid added. Nitric acid, one drachm to an ounce of water, is an acidifying solution that also gives good images.

The sharpness of definition and the whites in these negative pictures being so good, the only desirable point still to attain is, to give greater intensity to the dark parts. With this object in view, I am still experimenting, and with good hope of succeeding shortly. It will then give me pleasure to communicate the result, with particulars, to this Society.

Before I conclude, I may say that I have seen mention made in the 'Year Book of Facts' for 1858, pp. 208 and 209, of some experiments by the celebrated photographer M. Nièpce in that year, of a somewhat similar nature to mine. He used ordinary sensitive paper, and could obtain only a faint image after placing it in contact with an engraving or design, which it *was indispensable should itself have been exposed for some time to strong sunlight*. The discovery of my process was eighteen years prior to this; and by it the exposing of the engraving or design to be copied to the light, in the first instance, is not at all necessary, however long it may have previously been in the dark; and the image produced is almost all that can be desired in a negative. I do not think that by using ordinary sensitive papers, good pictures with clear whites can be produced, but consider the employment of acids in the preparation of the papers to be indispensable in order to obtain them.

A unanimous vote of thanks was tendered to Mr. Busk for his interesting communication.

The President then said,—You are aware that the Collodion Committee appointed by the London Photographic Society has made its

Report. I have read the Report with some surprise; and as I think it is the duty of societies like our own to do all in their power to prevent those who are looked upon by the public as photographic guides from leading them astray, I shall call on Mr. Heisch to make some remarks on that Report.

Mr. Heisch said,—Sir, in March 1859, the Photographic Society of London appointed a Committee to examine collodions with a view, as stated in the Report before us, of arriving at a definite formula. The Report of that Committee was to have been discussed at the last meeting of the Society. All who were present will remember how abruptly the discussion was concluded. It is not, however, to comment on this subject nor on the strange position in which a society places itself by appointing a committee to examine and report on an important subject, and when that committee makes its report, neither adopting, rejecting, or even discussing its recommendations, that I now come forward. Had the Committee confined itself to matters in which only the Society appointing it were concerned, I would not have been the one to meddle in other men's matters. I should not have said one word to-night did I not feel that a great injustice has been done to the public in general, and the manufacturers of collodion in particular, by the wording of this Report. I acquit individual members of that Committee of any intentional injustice; but that injustice has been done I fearlessly assert. Sir, the Report of the Committee states that the collodion made by Mr. Hardwich is "in regard to sensitiveness, unsurpassed," that "it is of superior excellence," and they "confidently recommend the Society to stamp it with the full mark of its approbation." Sir, if these words mean anything, they mean that, in the opinion of the Committee, this collodion is more sensitive, and altogether better than any in the market. Now, Sir, there are hundreds of people who have neither time nor inclination to examine various samples of collodion for themselves, who will receive this as an authoritative judgment, and will not even take the trouble to examine the Report and find out (what would surprise any one who reads the words quoted) that the collodion in question was never compared with any other, and, moreover, that the facts concerning its working properties detailed in the Report form but a very slender foundation for such unqualified praise! Makers of collodion will naturally feel delicate in protesting against this Report; and it is on that account that I feel that we, who are neither makers nor vendors of collodion, ought to come forward and protest against a Society supposed to be the leading Photographic Association in England putting it into the power of any tradesman to use its name in proclaiming the superiority of the article he sells, more particularly when we consider that the article in question has not been compared with that of other makers.

I will now say a few words on the Report itself, to justify the observations I have made.

First, we are told that the collodion is "comparatively, if not entirely, free from glutinosity, crapy lines, contractility, and other defects of film met with some years back." Now, Sir, I would ask, with what has it been compared? Certainly, not with any of the first-class collodions in the market, many of which are *entirely* free from any of these defects. Next we are told that it "*sometimes* contains too much soluble cotton for large plates, and *occasionally* requires thinning down in hot weather." These words 'sometimes' and 'occasionally' are very significant, showing as they do that the collodion is not always alike. Another proof of the want of uniformity is, that Mr. Fenton states that, on using some of the earlier samples of the collodion, he was obliged to roughen the edges of his largest plates, to prevent the film from curling off, but that with subsequent samples it was unnecessary. Were these later samples made according to the formula originally sent to the Committee? If so, it is clear its results are not always uniform; if not, it cannot be called the same collodion.

Next, we are told of a tendency to irregular drying. This, however, is said to be inconvenient, but not insuperable.

We come next to sensibility, which we are told is, in the opinion of the majority, unsurpassed. To justify this expression, it should have been compared under the same conditions with every other collodion, which there is no pretence even that it was by the majority, while the only member of the Committee who compared it with any other found that it took double the time. An attempt is made to explain this by the fact of his using a weak developer; but, as we may fairly presume he used the same for both collodions, the explanation is far from satisfactory. Mr. Frith's private letters are here pressed into the service, but will not do much towards proving the unsurpassed sensibility of this collodion with those who have seen the instantaneous pictures of Mr. Lake Price and others, taken with other collodion, not in the clear light of Cairo (which contains, according to the careful experiments of Bunsen and Roscoe, more chemical rays than the light in any other part of the world yet examined), but in London,—not on 4½-inch, but on 12-inch plates.

With regard to keeping properties, unless iodized with cadmium, it loses its sensibility in two or three days in warm weather,—no slight defect in most people's opinion.

In speaking of the gradations of tone in the pictures produced by the collodion, after many rather contradictory remarks, the Committee conclude that it is "sufficiently good." Sufficiently good for what purpose?

One gentleman next speaks of transparent spots with tails, and two or three of fine black lines. Curious defects in a collodion to be stamped as of superior excellence by the Photographic Society!

One point mentioned by Mr. Fenton strikes me as very remarkable, viz., that, when used with the addition of bromide, it will not bear the least over-exposure. With all collodions which I have tried, bromides enable them to bear a much greater amount of exposure without injury.

I cannot but remark that, though three formulæ were sent, not one word is said of two of them; and the gentleman charged with examining them only says he assisted at the preparation of Mr. Hardwich's, but does not tell us if he succeeded in preparing it without that gentleman's assistance.

Now, Sir, let me sum up the facts of the Report.

1. The film is not quite structureless.
2. Its properties are not quite uniform.
3. When compared with other collodion, it was not so sensitive.
4. It has no keeping properties unless iodized with cadmium.
5. There are complaints of transparent spots and dark lines.
6. When bromized it soon solarizes.

Yet this collodion is to be stamped with the approbation of the London Photographic Society as of "superior excellence," and "unsurpassed sensibility"! If I could believe such a thing possible, I should be inclined to say that the Committee must have furnished the facts, while some other individual has drawn the conclusions.

I beg to have it understood that I offer no opinion on the merits of Mr. Hardwich's collodion. I point out only the discrepancies in the Report.

I am perfectly aware that much of what has so strange an appearance may be capable of explanation, and I have made the strong remarks I have to-night partly with the view of giving the Committee that opportunity of explanation which was denied them at their own Society.

The injustice to other makers of collodion cannot be explained away—and it is against this that I wish our Society to protest; but the unfavourable impression so commonly, I may say universally, entertained of the Report itself, may, I trust, be at least partially removed. At the same time I cannot but remark that Mr. Hardwich's letter published in the last Number of 'The Photographic Journal' will rather increase than diminish that unfavourable impression. Mr. Hardwich puts himself prominently forward as champion of the Report, forgetting that he is not one of those who signed it, and is therefore not answerable for its contents, and forgetting also that he is the manufacturer of the article which is reported on.

After some remarks to the same effect from other members of the Society, Mr. H. Williams proposed, and Mr. J. South seconded this resolution, which was carried unanimously:—

"That the remarks of Mr. Heisch be adopted as expressing the opinion of the Society."

The meeting then adjourned.

On the Manufacture of Photographic Collodion.
By T. F. Hardwich, Esq.

[Continued from page 177.]

Preparation of Collodion.

1. *The Pyroxyline.*—I have always adopted the plan of laying in a large stock of acids at one time, since it is somewhat troublesome to ascertain the exact strength, and no mode of analysis seems to be perfectly satisfactory. The manufacturer sends in three carboys of oil of vitriol, holding six gallons each, and one carboy of strong nitric acid of the same size. These are bottled off into Winchester quarts, or half-gallon stoppered bottles (labelled No. 1 for the first carboy, No. 2 for the second, and No. 3 for the third), for the sake of greater convenience in handling, and to lessen the chance of the acid absorbing water from the atmosphere. As the strength of the oil of vitriol in each carboy is different, a mixture must be made of No. 1, No. 2, and No. 3, taking a single bottle of each. Then, supposing the specific gravity of the acids to be nearly as before given, mix as follows:—

Oil of vitriol, 1·843 at 60° F.	18 fluid ounces.
Nitric acid, 1·457 at 60° F. .	6 fluid ounces.
Water	$5\frac{1}{4}$ fluid ounces.

Pour in first the water, then the nitric acid, and lastly the oil of vitriol; obtain a perfect admixture by stirring, and take the temperature. If the thermometer rises to 165° F. or 170°, the acid must be allowed to cool until it stands exactly at 150° F. Then immerse the cotton in pieces well pulled out, and weighing thirty grains each, continuing to put them in singly until *ten* have been introduced, making 300 grains in all. This operation, together with

the pressing against the sides of the vessel, &c., (to be alluded to again presently), will occupy about two minutes, after which the vessel may be covered up and left for eight minutes more. Then take out the whole of the pyroxyline in one lump with glass spatulas; squeeze out as much of the acids as possible in a porcelain capsule, and dash the whole into a large quantity of water.

An experienced person will be able to judge at this stage of the process whether he has hit the right point. If, on attempting to lift out the whole mass of pyroxyline at once with the glass spatulas, it seems rather small in quantity and very rotten, so that little pieces break away and are left behind in the acid, then the temperature is too high, or the acids are too weak, and in repeating the operation the quantity of water may be diminished by two or three drachms. If, on the other hand, the mass of pyroxyline appears large, sticks well together, and shows no tendency to tear, either the temperature has fallen several degrees, or it will be advantageous to work with a few drachms more of water.

Whilst the pyroxyline is washing in the tray, it is still more easy to judge of its quality; for if the ten separate pieces, in which the cotton was originally weighed, are seen floating about, and can be separated and counted, the acids are certainly too strong; whilst if there be an evident aspect of commencing solution—a piece of cotton here and there scarcely changed, but the others in a measure broken up, and tearing easily under the finger,—the operation is probably successful; but when the whole is so mixed up together that nothing but fragments of the ten pieces can be detected, then the pyroxyline is too weak.

I find that it takes twenty-four hours to ensure the proper washing of the pyroxyline, even in slowly running water which contains a portion of chalk. This carbonate of lime evidently acts in neutralizing the acid; and bubbles of carbonic acid gas form, which bring the cotton by degrees to the surface of the water, and keep it floating.

After a thorough washing, the pyroxyline is squeezed in the hand, and then picked out to dry upon a cloth. A boy performs this part of the operation; and after a little experience, he can easily tell whether the material was properly made, partly by the extent of surface which it covers upon the cloth, but more easily by the readiness with which it tears under the fingers. If it resembles the original cotton in appearance, and feels strong and tough, the amount of water in the acids must be increased; but when it breaks up into little bits, it is as it should be—or else is somewhat too weak, in which case the fragments will mat together, so as to increase the difficulty of picking them out. As the pyroxyline dries upon the cloth it is well to examine it and give directions accordingly, separating any piece which appears less acted on than the rest.

Two or three days' exposure to the air will render the soluble cotton sufficiently dry; but it is convenient to finish it off on the hot steam-bath before-described, and the temperature of which is not allowed to rise higher than 120° F. When dry, proceed to weigh it in the scales, and form your estimate of its value accordingly. A long experience convinces me that, supposing nothing to be lost in the washing, the weight of the resulting pyroxyline is a certain and safe guide in this process; and I can always tell what the quality of the collodion will be by using the scales. If 300 grains of cotton yield 450 grains of pyroxyline, it is certain that complaints will be made of the resulting collodion being thick, and giving streaky pictures: four or five additional drachms of water in the nitrosulphuric acid will be the remedy. When the weight of the pyroxyline is the same as that of the original cotton, viz. 300 grains, there will be a sediment on dissolving it in the mixed ether and alcohol; nevertheless the collodion, although lessened in quantity, will be good—very limpid and structureless, with great adhesion to the glass, less tendency to markings of all kinds, and considerable softness of negative, with sensitiveness to dark rays. The chance of spots, however, is peculiarly great with this collodion: for if the smallest particle of dust touch the film, it will almost certainly arrest the development, and produce a transparent circular mark.

The weight which on the whole I think to be best is 375 grains, that is to say, exactly 25 per cent. of increase: this gives sufficient fluidity of collodion, and at the same time leaves very little sediment in dissolving.

The above facts are quite reliable, since they have been verified by repeated observation, extending over a long time. It must, however, be distinctly understood that the weight of the pyroxyline can be taken as a criterion of quality only under the conditions stated in this paper: the fibre of the cotton must be cleaned by potash and quite dry, the nitric acid nearly free from chlorine, the time of immersion always the same, and, most important of all, the temperature correctly ascertained; otherwise the weight will be so variable that nothing can be deduced from it, and the cotton may be considerably acted on even when the acids are strong enough to produce an explosive variety of pyroxyline. The whole

process, in fact, requires care, because it is conducted with the maximum quantity of water, and at a high temperature. At least 20 per cent of the pyroxyline is dissolved in any case; and the acids having once begun to act, will readily destroy the remaining portion of the fibre, if an error be permitted.

Before passing on to the preparation of the collodion, it may be mentioned that the quantity of pyroxyline which I find it convenient to make at one operation is four times that stated. A double quantity of acids (36 ounces of sulphuric and 12 of nitric) is mixed in a jug, and poured out into the porcelain pots before mentioned. The first 300 grains of cotton are then immersed and left digesting, whilst the second similar portion is put into vessel No. 2. When the pyroxyline has been removed, the acids are emptied out, and a double quantity again mixed as before. At one time I adopted the plan of using the old acids again, by adding oil of vitriol to restore the strength, but afterwards discontinued it as causing uncertainty.

2. *The plain Collodion.*—This is made by introducing half a gallon of alcohol of ·805 into a two-gallon stoppered bottle, and adding 1900 grains of dry pyroxyline. When the pyroxyline has become thoroughly saturated with the alcohol, pour in half a gallon of ether of ·725, and agitate for two or three minutes; next add another half gallon of ether, and again shake the bottle for a few minutes. After this the collodion may be allowed to settle for about a week or ten days, when it will be sufficiently clear for use. The quantity of pyroxyline may be increased to 2200 grains when a collodion of some body is required, or reduced to 1800 for a thin collodion suitable for large plates. Supposing the height of the column of collodion as it stands in the bottle to be 10 inches, the sediment, measured twenty-four hours after mixing, is often about half an inch, but it settles down more closely at the expiration of a week or ten days. If the sediment should stand as high as 2 inches in the bottle, the collodion is probably of that kind which has been described as giving a soft negative with a tendency to white spots. The above point being of importance in a commercial point of view, I have taken pains to collect the sediment from more than two hundred gallons of collodion, and find that the loss does not exceed one pint in fifty. It appears at first to be much greater than this, but the residue continues to settle for many months, the clear collodion being occasionally drawn off from the upper part and added to the general stock, a small portion at a time. I have sometimes thought that the proportion of *undissolved* matter is greater when the pyroxyline has been dried by artificial heat; but I am not able to speak positively, since I usually dry by spontaneous evaporation.

On the day following the preparation of the collodion, about half of a fluid ounce may be drawn off by a pipette from the upper clear portion, and a minute piece of red and blue test-paper immersed for twelve hours. If, at the expiration of that time, the blue paper appears reddened, the pyroxyline was imperfectly washed, and the standard alkaline solution, which I shall immediately describe, is dropped into the plain collodion in the proportion of one full-sized drop to each half gallon. This addition of alkali is seldom required in my practice; certainly not oftener than once in twenty times. If, however, the pyroxyline be removed from the washing-tray at the expiration of twenty-four instead of forty-eight hours, traces of acid are generally to be detected in the collodion. To make the standard solutions which are required, dilute the nitric acid of 1·45 with an equal bulk of water for the acid, and then dilute down the strong ammonia of commerce also with distilled water, until a fluid drachm exactly neutralizes a corresponding bulk of the standard acid. With these two liquids at hand no further trouble will be experienced, since the quantity of acid left in the pyroxyline varies very little; and if any number of drops of ammonia be added in excess, a corresponding number of the acid liquid will neutralize them.

3. *The Iodizing Solutions.*—There are three iodizing solutions, made by the following formulæ:—

No. 1. (Potassium iodizer):—

Alcohol, ·817 at 60° . . . . $1\frac{1}{2}$ gallon.
Iodide of potassium . . . . 3200 grains.

It is necessary to pulverize the iodide very carefully, and to warm the spirit in a glazed covered saucepan to about 120° F.; after which, on drawing it off into a stoppered carboy, perfect solution will take place with ten minutes' shaking. Filter through pure bibulous paper.

No. 2. (Cadmium iodizer):—

Alcohol, ·817 at 60° . . . . $1\frac{1}{2}$ gallon.
Iodide of cadmium . . . . 4000 grains.

Dissolve in the cold; no pulverizing required.

No. 3. (Bromo-iodide):—

Alcohol, ·817 at 60° . . . . $1\frac{1}{2}$ gallon.
Iodide of ammonium . . 2000 grains.
Iodide of cadmium . . . . 2400 "
Bromide of ammonium 1200 "

Pulverize and dissolve without heat.

The proportion in which these iodizing solutions are to be added to the collodion is the same in each case, viz. two fluid drachms of iodizer to six drachms of collodion. They may be employed separately or in a state of mixture; but it is not advisable to add No. 3 to No. 1 in a proportion greater than one-fourth of the former, lest crystals of bromide of potassium should be precipitated.

Precautions to be observed.

At the risk of appearing prolix, I have decided on calling attention to certain minor details of manipulation, which are in themselves simple, but may be unknown to some who may yet wish to carry out the instructions contained in this paper.

Beginning with the cotton, which we suppose to have been previously cleansed by potash, it will be necessary to dry it very perfectly before using the acids, since the quantity of water which I have given in the formula is so great, that any further dilution would certainly ensure the destruction of the fibre by the nitrosulphuric acid. The cotton may be dried near the fire, or upon the steam-bath before mentioned; and, when once dried, it must not afterwards be left in a damp place.

In mixing the acids, it simplifies matters to select a stoppered bottle which holds very nearly the proper quantity of oil of vitriol when filled quite up to the neck. The nitric acid and the water may be measured in a narrow cylindrical hydrometer glass,—a mark being made for the former with black varnish, at a height corresponding to one-third of the bulk of the oil of vitriol, and a second mark lower down for the water, the quantity of which will vary according to the strength of the acids. Before using these measures, always invert them, and allow the drainings from the last operation, consisting of acid diluted by absorption of atmospheric moisture, to flow out. Then measure the oil of vitriol, and make a leaden counterpoise for it in the scales, bottle included. This is necessary when perfect accuracy is desired, since otherwise the nitrosulphuric acid will be stronger in winter than in summer, which I have found to be the case to a noticeable extent—the product of pyroxyline obtained from 300 grains of cotton being 50 grains heavier in frosty weather than during the hot months of June and July. It is not absolutely necessary to weigh either the nitric acid or the water; and, with regard to the sulphuric acid, the plan which I have adopted has been to measure it as a rule, but to put the bottle afterwards into the scales, if a sudden change of atmospheric temperature takes place.

A failure would certainly be produced if the three constituents of the nitrosulphuric acid were not properly mixed; but there is no difficulty in effecting this by stirring with the broad spatula for half a minute in a shallow vessel. In the deep porcelain pots before spoken of, it may not be quite so easy; and thus it is advantageous to adopt the plan which I have usually followed of mixing a double quantity of acids at one time in a jug, and pouring it afterwards into the pots. The sides of the jug, however, must not be too thick, or the temperature will sink below 150° in very cold weather, especially when the sulphuric acid is a little weaker than usual, or the mixture is kept too long in the jug.

Some may perhaps be inclined to keep a portion of the nitrosulphuric acid ready prepared, and to obtain the correct temperature by mixing cold acid with the hot. If so, bear in mind that a stoppered bottle must be used, since nitrosulphuric acid, like oil of vitriol, absorbs water from the atmosphere. On one occasion some experimental results were completely spoilt by leaving the acid for a few days in a beaker covered by a glass plate; the upper part became so far weakened that, on putting in the cotton, it instantly dissolved.

Taking the temperature of the acids is an operation of some nicety, and especially so in cold weather. Begin by stirring briskly with the glass spatula in a circular direction; then dip the thermometer exactly into the centre of the liquid, and hold it in that position for at least a minute, since the rise of the mercury, although rapid at first, may be very slow towards the end. If the acid be too hot, it can be cooled two degrees by taking a cold spatula and stirring it for a few seconds; therefore it is of consequence that the spatula which is used to immerse the cotton should be previously warmed by dipping it in the liquid. The acids also must be at least at 165° F. when they are first placed in the porcelain vessel, otherwise its thick porcelain sides will reduce the temperature so rapidly that, although the thermometer may indicate 150° F. at first, it will soon fall, and the weight of the resulting pyroxyline will be greater than that indicated for a given strength of acids. In order to obtain a uniform temperature during the time that the pyroxyline remains immersed, I invert large jars upon the porcelain pots, and keep them covered, so as to prevent the cold air from blowing on the sides.

The boy who weighs the cotton, into pieces of 30 grains each, is directed to pull out each piece thoroughly, and work it with his fingers into a circular form, to facilitate absorption of the acid. In pursuance of the same object,

each piece, as it is placed in the acid, is carefully pressed with the spatula against the side of the vessel; and in order that the last pieces may not be at the top (in which case they always come out less broken than the others), a *well* of acid is kept free by means of the spatula, and these last pieces are pushed down nearly to the bottom. When all have been immersed, the mass is squeezed against the vessel, first on one side and then on the other, for more than a minute, after which the whole is loosened by putting the spatula down to the bottom, and raising it up until the pyroxyline nearly fills the liquid; the vessel is then covered up and left for eight minutes, as before said. I think it of consequence not to finish the process of putting in the cotton by pressing it down to the bottom in a hard mass, because a good deal of solution always takes place in the acids, and this is attended with an evolution of *heat*, which increases the disintegrating action on the cotton. The object, therefore, is to prevent the mass from "heating" as far as possible, by loosening it out with the spatula and diffusing it through the liquid. Observe, however, that the cotton must not be permitted to project above the surface into the air, or oxidation and evolution of red fumes will take place. These little matters may seem unimportant, but unless they are attended to, no two portions of pyroxyline will correspond in weight.

I employ both spatulas in removing the pyroxyline from the acids, forcing them down to the bottom on opposite sides, and then bringing them together so as to pinch the mass and lift it out entire. In squeezing the acids away no time must be lost, or the action of the air may produce oxidation and red fumes. A few seconds will be sufficient, and especially so if great pains be taken to distribute the pyroxyline through the water by catching it with the gloved hand. A sensation of heat is felt at first, due to dilution of the oil of vitriol; but this soon ceases, and the chance of failure from that cause is very slight. If the material, however, were simply thrown into a small quantity of water and allowed to remain, the rise of temperature might be sufficient to cause solution.

I was not without hope at first that the waste nitrosulphuric acid, which one scarcely likes to throw down the sink lest it should act upon the leaden pipes, might be useful for some other process. In this expectation, however, I have been disappointed, since the pyroxyline which it contains in solution appears to interfere with its application to any such purpose as dissolving metals, &c.

I will here remark upon the importance of rejecting any pyroxyline which turns out unsatisfactorily—perhaps from the cotton having been laid on a wet board, or left too long in the acids, &c. If any such accident happened in my practice, the whole batch was at once thrown down the sink, since collodion is an expensive material, and one of too much consequence to be trifled with.

At first I was in the habit of placing the pyroxyline in the gutta-percha washing-dish immediately on taking it from the acids; but finding that the heat and acid together gradually decomposed the gutta percha and made it sticky, the plan was adopted of throwing the soluble cotton first into a leaden sink, and when the greater part of the acid had been removed by a few hours' washing, lifting out into the gutta-percha dish.

The gutta-percha washing-tray will require cleansing after a week or so; a deposit adheres to the bottom, which seems to consist of matted fibres of partially dissolved pyroxyline. This material having been some time in the water, might perhaps decompose and liberate oxides of nitrogen in collodion. I am careful therefore not to disturb it at first; and when sufficient has collected, it is scraped out, and the tray washed with water.

It is better not to complete the washing of the pyroxyline with boiling water, nor to use any carbonated or caustic alkali to remove the last traces of acid. All alkalies tend to decompose pyroxyline, and remove a portion of the peroxide of nitrogen in the form of nitrite; and although I am aware that dilute ammonia is commonly employed to neutralize the acid, I have long discontinued its use, finding that some varieties of pyroxyline assume a yellow colour, and become more unstable in collodion when previously treated with ammonia.

The pyroxyline may be prepared in small quantities at a time, as required for use; but if it be necessary to keep it in stock (which I myself have never done), it should be dried either over oil of vitriol, or at a temperature below 120° F. Mr. Hadow mentions 140° F. as the point which ought not to be exceeded. Probably something depends upon the particular variety of pyroxyline; and with some kinds I have seen red fumes given off, on placing the material in a covered tin vessel surrounded by boiling water. Pyroxyline for keeping ought also to be put away in a dry place, and excluded from light, since this substance is known to be liable to spontaneous change, and, unfortunately, the exact conditions of permanency have not been ascertained.

Having completed the preparation of the pyroxyline, this list of "Precautions" is nearly at an end: a few words on the subject of plain

collodion will close it. When first I commenced the manufacture, I employed glass carboys for holding the collodion, but afterwards rejected them for two reasons: partly because the shape is inconvenient as regards the deposition of the sediment; and secondly, the glass being sometimes badly annealed, has been known to yield to the inside pressure in hot weather. For the last two years and a half I have substituted narrow-mouthed stoppered bottles, holding two gallons each: they may be obtained of Messrs. Brown and Co. of Farringdon Street.

There is a decided advantage in placing the alcohol in the bottle before the ether, not only in facilitating the solution of the pyroxyline, but also in enabling the operator, by shaking the bottle, to remove a flocculent deposit, which otherwise is apt to adhere and to be drawn over with the collodion; the mass of pyroxyline wetted by the spirit acts effectually as a *mop*, and cleanses the sides.

In drawing off the collodion, place the bottle in such a position that the end of the siphon comes between the eye and a strong light; any flocculi which appear likely to be drawn into the end of the siphon will then be seen, and may be avoided. When it is not intended to refill the bottle immediately, pour out the sediment and introduce half a gallon of absolute alcohol, which will absorb the remaining ether vapour, and prevent it from being oxidized into acetic acid, and afterwards forming acetic ether. On one occasion a two-gallon bottle having been used for collodion and left empty, was put away in a dark place for about three months. It was then washed out with about a pint of plain collodion and refilled. The result, however, was unsatisfactory; for on adding the iodizer to the newly made batch, it at once became yellow, which was probably due to portions of collodion left at the bottom of the bottle having decomposed and ozonized the ether. Mere washing with plain collodion was not sufficient in this case, and a thorough cleansing with shot and water should have been resorted to.

No attempt must be made to utilize the sediment of the plain collodion by redistilling the ether from it. This I have tried, but with indifferent success; for although the ether so recovered appeared tolerably good at first, it soon acquired the property of liberating iodine from iodide of potassium; and the collodion then became unfit for any purpose, except copying objects of still life, where extreme sensitiveness is not required.

Whilst the collodion is settling down, the bottle should be covered over, to exclude the light. The room which I used was a vault lighted by gas; and whilst plain collodion remained in that room, it continued good; but if any portion were taken up into the glass house and left exposed, I always found that it gradually deteriorated, colouring at once on adding the potassium iodizer, and being deficient in sensitiveness.

In manufacturing collodion in large quantities, I think that mistakes will be prevented, if separate measures, scales, funnels, &c. are kept for each purpose; and in cases where two operations are being carried on at the same time—such as picking out wet pyroxyline, and filtering iodizing solution—a basin of water may be placed near at hand, into which the boy dips his fingers in passing from one process to the other. The mention of matters so trivial may excite a smile; but I think that the importance of extreme method in all matters relating to photography is sometimes overlooked.

Observations on the preceding Formula.

The distinctive peculiarity of the collodion now described is in the pyroxyline, which, by a proper adjustment of the proportions of the two constituents of the nitrosulphuric acid, acquires peculiar properties. These I need not now describe, seeing that they are sufficiently referred to in the Report of the Collodion Committee; suffice it to say that, by using the sulphuric acid much in excess of the nitric, great transparency and toughness of the film are secured, with a fine surface-texture, which gives sharp definition. At the same time a quality of image is obtained corresponding closely with that produced by an organic material like gum-arabic applied to the surface of the film, and possessing a fine ruby-red colour when taken in a moderately good light.

With regard to the temperature at which the pyroxyline should be made—I worked at first at 140° F.; but at the commencement of last spring was induced to raise it ten degrees, in consequence of representations that the collodion was somewhat deficient in fluidity. This increase of temperature, however, assists in generating traces of a body (probably nitroglucose) which causes the collodion to lose its sensitiveness more rapidly after iodizing.

Some perhaps will not be prepared to believe that a sensitive pyroxyline can be made at so high a temperature as 150° F.: and with nitrosulphuric acid of the ordinary composition, this would indeed be difficult. When, however, the proportion of nitric acid is greatly reduced, I do not find that the sensitiveness so much affected by the temperature of the acids.

The proportions of ether and alcohol in the collodion: half-and-half will, I think, be found

to be those best adapted for general purposes. With less alcohol the film is more contractile, and more prone to dry up after sensitizing. With a larger proportion of alcohol, say two parts of alcohol of ·805 at 60° to one of ether of ·725, the sensitiveness is impaired. A friend, whose judgment is quite to be relied on, has used more than two gallons of my collodion prepared with excess of alcohol, and he assures me that it is remarkably well adapted for coating large plates, and is sufficiently sensitive for copying works of art and for landscapes: nevertheless I do not recommend this formula in preference to the other for a normal collodion, seeing that we have no means of increasing sensitiveness when it proves deficient.

I have tried the effect of varying the strength of the alcohol from sp. gr. ·805 to ·820. When the ether and alcohol in the collodion are used in equal parts, the latter must not be in what is termed the absolute state (sp. gr. ·805), or the film will be more or less impervious to liquids, like gutta percha, if the particular pyroxyline which I advise be adopted. With alcohol not stronger than ·820, the collodion works well at first, but becomes rather thick and non-adherent towards the bottom of the bottle. I therefore take an intermediate strength, by using alcohol of ·805 for the plain collodion, and alcohol of ·817 for the iodizer.

The quantity of iodide of potassium in collodion made by this formula ought not greatly to exceed 3½ grains to the ounce, or there will be peculiar markings on the surface of the iodide of silver at the lower corner of the excited plate. The purer the pyroxyline, the greater the chance of the iodide being in excess; but nevertheless, if the above-mentioned quantity should produce a film more opalescent than the operator desires, it will be in his power to give additional creaminess by introducing a little iodide of cadmium, without any danger of the iodide bursting out upon the surface and producing the marks before described.

In the Report of the Collodion Committee recently published, I think that an erroneous impression is conveyed as to the length of time this collodion will keep after iodizing, which may have resulted from several Members of the Committee having worked in a bad light. Certainly there are some varieties of pyroxyline which displace iodine from iodide of potassium less rapidly than the pyroxyline which I advise; but there are others which do so more rapidly, and hence the position of the collodion as regards keeping properties is intermediate. It is also in our power to increase the stability, by using the mixed iodides of potassium and cadmium instead of the iodide of potassium only, after which the collodion will retain a fair share of sensitiveness for many weeks.

The cadmium iodizer has not the marked effect in glutenizing this collodion which it is known to exercise with some other kinds; and when the nitrosulphuric acid is used at the weakest point possible, the resulting collodion, iodized with cadmium, will be quite manageable even on glasses of considerable size.

White spots have been spoken of in connexion with the potassium iodizer. My experience leads me to believe that they do not depend upon any insoluble particles, but are due to specks of dust adhering to the film. I find the same spots oftentimes in collodion containing only iodide of cadmium; and since the mixture of ether and alcohol given in the formula is capable of dissolving 4 grains of iodide of potassium to the ounce, it is not easy to understand how there can be any insoluble particles when only 3½ grains are employed.

In proposing the pyroxyline mentioned in this paper as a good commercial form, I would call attention to the tenacity with which it adheres to the glass. It has been pointed out to me that the collodion, after keeping for a time in the iodized state, is well fitted for use in Taupenot's process, and does not show any disposition to rise in blisters beneath the albumen.

The principal fault which I found in this collodion during the last summer was the occasional occurrence of fine black lines, showing on the finished picture in the direction of the dip. They are most abundant when the pyroxyline is made in rather concentrated acids; and by increasing the quantity of water in the nitrosulphuric acid, are nearly removed. Much may therefore be expected from the use of potash as a cleansing agent to the cotton, since a weaker nitrosulphuric acid can then be employed without causing solution of the fibre.

The foregoing paper is incomplete in one point, viz. in not describing the effect of leaving the cotton in the nitrosulphuric acid for a longer or shorter time. My experience has been, that a short immersion gives a product at least 15 per cent. heavier, but dissolving in the ether and alcohol with a larger amount of sediment, and yielding a slightly less limpid collodion.

On the Manufacture of Collodion.

By Robert Freeman Barnes, Esq.

The following paper contains experimental matter in connexion with Collodion calculated to be of more or less value to those interested in its manufacture.

Professionally engaged in Photography, I am continually annoyed by failures depending entirely upon the collodion of commerce, such as inequality of film, irregularity of development, streakiness of coating, &c. &c. I was led to consider the possibility of avoiding all these little *contretemps*, and of producing a collodion that should be more under command than that to be obtained in the commercial world, which I have never yet found perfect.

Those who have any experience with collodion know that its working is always attended with great uncertainty, and that although, in the hands of a good operator, a certain sample may be made to produce comparatively favourable results, still the disadvantages attending the use of all collodions hitherto manufactured must have caused considerable disappointment to the photographer, and have induced him to inquire whether it were not possible to obtain an article which should be workable under all circumstances.

It is true that the discovery and manufacture of such a preparation demand on the part of the manipulator a thorough knowledge of the behaviour of collodion in all its different states and modifications—knowledge only to be obtained by long practice and close observation and research.

Unfortunately there are so few true disciples of the science willing to undergo the toil and expense of experimenting and comparing results, that photographers have for a long time been comparatively at the mercy of a few commercial manufacturers of collodion, and have been content to endure considerable annoyance, besides incurring much expense, by the use of articles in many cases vastly inferior in quality to what should be expected at the prices charged for them.

No amount of practical chemical knowledge is sufficient to foresee the changes that will take place in these collodions under various temperatures and circumstances, and the experiments, the results of which are given in this paper, were carried out with the view of obtaining an article thoroughly to be depended upon at all times and seasons.

I do not consider that a professional artist can safely or economically prepare his own collodion, the quantity employed by one operator being quite insufficient, generally speaking, to enable him to manufacture satisfactorily such an amount as to be used during its most perfect state. There must be a large demand in order to have it uniform in quality. There are very few men, comparatively, capable of detecting all the faults that may exist in a collodion, or even of explaining the requirements of a practical photographer, or of correcting defects exhibited by collodion in its different and ever-varying phases. There are many points to investigate in order to remove these obstructions in the road to perfection.

We have to consider the great difference in the sensitiveness of collodion, and the causes of that difference. The want of roundness (without reference to light) exhibited by some samples. For instance, we may have two different collodions, that with the same light and exposure will give, the one a round picture, the other a flat one. These peculiar properties have to be investigated, and the causes of the important difference in action (independently of each plate having received visually the same exposure) must be ascertained.

I have been occupied a considerable time in researches with the view of arriving at some satisfactory conclusion, and I have obtained very important results.

Upon comparing a variety of samples, not only did the collodions of commerce differ much from each other, but the commercial pyroxyline was also of variable quality; and even collodion made with the same pyroxyline, but with different ether, varied greatly in sensitiveness.

Being led, therefore, to test these two products, I found that they were, in the greater number of cases, impregnated, more or less, with acid. Various samples of commercial gun-cotton and paper, obtained from the best sources, were tested, in order to ascertain whether a good collodion could be produced from them; but notwithstanding the perfect state of the collodion, as far as chemical manipulation was concerned, it was found to contain an amount of acid that interfered more or less with the highest point of excellence.

This was especially the case with the gun-cotton and paper, in the thorough washing of which important article manufacturers do not seem particularly careful.

Amongst other experiments the following was made.

About $\frac{1}{2}$ oz. of gun-cotton was placed in a pint wide-mouthed stoppered bottle, containing half a pint of pure distilled water and a drachm of chloroform. The distilled water must be perfectly pure, and not the description frequently vended as such, which is merely the condensed steam that has passed through the condensers of an engine. The cotton was left a few hours in this mixture, then drained off, dried on bibulous paper, and placed in a well-stoppered bottle.

Pyroxyline treated in this manner produced, under all circumstances, a more sensitive collodion than if not so prepared.

If preferred, the cotton may be well washed n renewed quantities of distilled water without he addition of the chloroform, and dried as efore. It is then better adapted for use with he accelerator hereafter described.

The acidity of the ether varies greatly in lifferent samples; and although in some cases t is but very slightly acid, it is generally ufficiently so to destroy one of the important roperties of collodion.

To correct with the alkalies usually emloyed, as ammonia, &c., although sufficient or the time being, only tends to its early ecomposition, and the film is destroyed and endered powdery in character.

The method I adopt to correct the ether is ery simple and efficient, and possesses no lisadvantages. Take one pint of pure washed ther with which half an ounce of absoute alcohol has been previously mixed, and dd to it the white of a newly-laid egg. The mixture must be violently shaken up, nd kept in a state of agitation for some ime. The alcohol assists in the coagulation f the albumen, which takes place in about ive minutes; but the proper action is not acomplished if too much alcohol—say one ounce —be at first added, as in that case the alumen coagulates so rapidly as not to leave ime to the ether to become thoroughly diested with it. After shaking it up for several ninutes, add two more ounces of absolute lcohol; this will entirely coagulate the alumen and precipitate it in a mass, so as to llow the ether to be readily decanted off perectly clear. The ether may remain in conact with the albumen forty-eight hours before lecantation. Being but slightly alkaline, the lbumen produces upon the ether the desired ffect without decomposing the cotton afterwards dissolved in it.

The effect produced upon the ether is renarkable. Sufficient ammonia is liberated rom the albumen to neutralize the small trace f acid present, and, providing the gun-cotton s perfectly prepared, the resulting picture is eautifully transparent in the shadows, the film s considerably strengthened, and the sensiiveness increased.

The negative developes with great purity of ction throughout the entire body of the film, nd the desirable roundness and beauty are produced, according to the brilliancy of the light. The most satisfactory results are obtained when iodide of potassium alone is used as the iodizing agent.

When the weather is very bad and foggy, s in winter time, extreme delicacy can be btained by the addition to the collodion of chloric ether, in the proportion of one drachm to the ounce of collodion. Collodion treated in this way can be used when it would be impossible, from the state of the light, to obtain a brilliant picture by any other method. The shadows will be perfectly clean and transparent, notwithstanding the long exposure: in fact, for use in winter time, and for copying statuary, no collodion can be compared to it for clearness, delicacy, and safety in working. It will even give a brilliant picture with a foggy light. It is also well adapted for use in hot weather, and is not in the slightest degree structural in character.

In one of my experiments, having washed a portion of ether with milk and distilled water, I made with it some collodion, and tested it against collodion made with the same ether previously to its being so treated.

The milk collodion was the more sensitive of the two—in fact, it was the most sensitive I had ever tried; but it required a long development, and there was a tendency to fog, although the negatives might generally be considered as good in quality. The fogginess was more apparent when violent subjects were taken, and a long exposure was requisite to ensure softness. This experiment therefore had no other result but to convince me of the benefit to be derived by the use of organic matter in collodion, and to encourage me to continue my researches in the same direction. I had previously used butyric acid, but the result was unfavourable.

The substance I have now selected as an accelerator is cod-liver oil.

I had never been able to obtain an absolute amount of certainty with the sensitive collodions of commerce, as, independent of careful manipulation, they are all liable to decomposition of some kind in the back-grounds or other parts of the picture that interfered considerably with the photograph, which would otherwise have been perfection. Up to the present time, I have not found the accelerator produce these disadvantages. I have found the collodion in every case equally rapid after being mixed some time, whilst commercial collodion that had been iodized at the same period, and against which it was tested, had lost much of its primitive sensitiveness.

All these experiments have been very carefully carried out during the last three years.

Having passed in review the qualifications a good collodion should possess, and having given a few of the experiments made, I shall conclude with a formula for a serviceable collodion, which has been arrived at by a careful comparison of the results of my researches.

The gun-cotton and ether must be corrected according to the directions already given, and

the ether should have the proper proportion of alcohol added to it.

Upon the average, four grains of cotton should be added per ounce; but no positively exact quantity can be given, owing to the variable solubility of the cotton: besides, collodion suitable for a stereoscopic plate would be much too thick for 12 × 12. The proportion therefore must be left to the practical skill of the manufacturer, and the collodion be made thinner or thicker according to circumstances.

Gun-paper can be substituted for cotton, previously treating it in the way described for the latter; and this collodion, when chloric ether is added to it, yields very brilliant results.

When the gun-cotton or paper is dissolved and the collodion decanted off, add to each imperial pint of the clear solution, 3 minims by measure of pure cod-liver oil, previously dissolved in $\frac{1}{4}$oz. of ether. The oil is very readily taken up, so that very little shaking is required.

If it is found that the negatives are not sufficiently vigorous, which might, under certain circumstances, be the case, the quantity of accelerator may be reduced one-third or one-half, and the collodion will still be more rapid than any hitherto produced by commerce.

In all the very sensitive collodions yet manufactured, there has been employed an organic substance, which, when added in too great a proportion, renders the pictures faint and weak.

I term the oil, for convenience sake, the accelerator.

The collodion is to be iodized with a saturated solution of iodide of potassium in absolute alcohol, to which, when filtered, $\frac{1}{2}$ an oz. of alcohol is to be added to each $3\frac{1}{2}$ oz.

When the collodion is required to be thinned, the corrected albuminized ether is to be used, so as to preclude the possibility of any change through the acidity of the ether.

Old insensitive collodion for portraiture is greatly improved, rendered serviceable and equal to any ordinary description of collodion, by the addition to it of the accelerator in the proportion of 3 minims to the pint, care being taken not to add an excess.

In conclusion, I may state that these experiments are to be regarded merely as preliminary investigations, with the object of getting rapidity with dry plates; and so far the accelerator acts admirably.

"Hours of Sunshine."

To the Editor of the Photographic Journal.

March 17th, 1860.

SIR,—Among the applications of photography to the aid of other branches of knowledge, there are few sciences that stand in so much need of assistance as meteorology. Facts in that science continue to be recorded with the most persevering industry, both at established observatories and elsewhere: such enterprise, though not unproductive of interesting results to satisfy present inquiry, yet in a fuller sense more resembles the labours of the sower than those of the reaper. It may be a distant epoch before their full value can be realized.

Photography is already made subservient to the registry of certain phenomena in magnetism and meteorology, and it permits an extension of what can be observed: as an instance of this, suppose that the number of hours of sunshine and cloud be of sufficient interest, or prospective interest, viewed in connexion with other items recorded, to merit a place in some of the registers,—it is now certainly very possible to accomplish this.

At the top of a building or elsewhere, where a free and open view of the sky presented itself, suppose a small camera fixed exactly south, and perhaps pointed to the celestial equinoctial, that is to say, inclined upwards to an angle equal to the colatitude of the place.

If instead of any lens there was a small aperture filled with a bit of thin glass or talc, and a piece of photographic paper of a certain description placed in the frame, and the whole rain-tight, it is obvious the sun, shining through the opening, would by its intensity cause a greater action on the sheet of prepared paper than the diffused light of the sky or cloud: hence a darkened line on the paper would show where the sun had shone, and its absence would show cloud: also, as the camera would be fixed due south, the times that sunshine occurred would be easily estimated by the distance of any part of the solar tract from the centre of the paper corresponding to the meridian or 12 o'clock line; or the paper could be ruled with the apparent hour-lines.

The preparation of the paper might require experiments; as it must not be too sensitive, or the day's diffused light would be sufficient to blacken it all over. It is probable, however, there is a paper used, or known, that would satisfy the purpose.

There is one other subject in connexion with meteorological records that seems worth a consideration,—namely, Can photography aid in supplying a diurnal register of the direction of the motion of the clouds,—say, when there is a sufficient light-and-shade contrast to render this at all likely?

Reverting to another topic: the remarks of "J. R. H." amount, I believe, to a suggestion that the larger stops be placed nearer to a

landscape lens than the smaller: he is pleased to say opticians *wilfully* or *stupidly* place all the stops in the same position. If " J. R. H." is accustomed to use a sliding diaphragm, there is no difficulty. But fixed stops, each in the position indicated, would at least be more complex and expensive, to say nothing of any possible disadvantage of receiving an oblique pencil larger than could be expected to come to any clear focus, want of flatness, &c.

There are sound optical reasons why photographers should use the smallest stop, if they want, what has now become a term, "*depth of focus.*" While photographers are, however, limited by chemical laws in the size of the stop they can use, opticians are no less limited by the geometrical law of refraction in the amount of aperture that can be given consistent with a clear focus. If " J. R. H." is an attentive reader of the 'Journal,' he will perhaps remember what Professor Petzval said about depth of focus.

The case is a very simple one, however, if the whole of a large pencil comes to a clear focus. This focal distance varies with every change of distance of the object by a well-known law in optics; we cannot make it more or less; its effect, however, on the plate is less and less sensible as the aperture is reduced. "*Depth of focus*" is a term allowed for convenience, but no one must expect that large aperture joined to "*depth of focus*" can coexist. By shortening the focus, we render it less apparent, as also by diminishing the aperture. The limit of our vision does not enable us to appreciate the difference in the focus of such objects. But geometrical optics has no such term as "*depth of focus*;" it is not allowed in the least, since the focus of an object and its distance from the lens are mutually related and dependent.

James T. Goddard.

Portable developing Camera.

To the Editor of the Photographic Journal.

Northwood, Staffordshire, Feb. 27, 1860.

Sir,—Having had the privilege of exhibiting at our Society's Soirée, in December 1856, a portable developing camera of my own construction, for working large plates by the "Wet" collodion process, in the open country, without the aid of a tent disconnected with the camera itself, permit me to offer a few remarks on the apparatus ("The Monographic Stereo-developing Camera"), exhibited at the Society's rooms.

Although a good dry process, such as Taupenot's or the Fothergill, offers immense advantages to these fortunate individuals who knew how to deal with their discouraging peculiarities, there are still many who, having exhausted their patience, and a good stock of chemicals besides, with the various "New Dry Processes," chimerical and culinary, ultimately find consolation only in a return to Wet Collodion; the delights of which they will own they would never have been tempted to abandon, had not the weight of the apparatus necessary for successfully working the same rendered porterage a somewhat unwelcome adjunct to photography. For these, and for other operators who, although habitually using dry plates, may at times be compelled to work with wet collodion or lose a coveted picture, my "Monographic Stereo Camera" has been constructed; and, if the annexed description of the apparatus should induce any brother amateur to procure a similar one, I can promise him, if he be not a mere tyro in the art, success in working in it any process, wet or dry.

In the instrument exhibited, the camera and dark operating chamber are combined, the latter being enclosed in the former; but when set up ready for use, the apparatus is of the form indicated in fig. 1.

When closed, the inner frame (d) (which, it will be seen by the accompanying diagram, fig. 2, supports the tent) falls down, taking the tent with it; and the whole is compressed into the camera by the back (B), which, when the apparatus is set up for use, becomes the operating table, having india-rubber bags affixed to contain bottles of solutions, collodion, &c., and a slot to support the exciting bath in its proper position,—the metal stay (K, fig. 1) serving to level the whole.

At the back of the tent are uncovered eyeholes (e e, fig. 2), through which all the operations, from collodionizing the plate onwards, can be observed. A light-tight curtain, like an ordinary focusing cloth, but attached to the tent, covers the head of the operator, and precludes the possibility of white light entering during manipulation; while he is enabled to see clearly what he is doing, by yellow light admitted through a square of yellow horn or glass at the top of the tent.

A partition is made in the middle of the body of the camera, indicated by the dotted line (d, fig. 2), and by the diagram, fig. 4, to which the frame, or plate-holder (C), is attached; this is so constructed as to fall, when not in use, close to the partition (d), and then it occupies a space only equal to its own thickness. In the partition itself, two square holes are cut, each $2\frac{1}{4}$ in. $\times$ 2 in. (fig. 4), to admit the rays from the lens (L, fig. 1) to the first half of the plate under exposure, while a smaller partition, which also serves for a support to the plate-holder (C), serves effectually to con-

fine them to one half of the excited plate at a time.

The camera (C) and the metal sliding bars (*b b*, fig. 3) are screwed upon a tripod in the ordinary manner: the screw (S), however, does not enter the bottom of the camera, which is retained close to the metal bars by the tongue (fig. 2).

If it be desired to take pictures at an angle of 2½ in. only, the small set screw (*v*, fig. 3) is not removed, the ends of the bars (*b b*, fig. 3) remaining level with the sides of the camera; but if a greater angle be desired, the camera is made to slide upon the metal bars from one side to the other (a range of 13 inches from centre to centre of lens being attainable by this means). The convergence is regulated by small set screws (*g g*, fig. 3) attached to the tripod and acting on the bars. In operating, one side of the plate is exposed at a time, the lens being capped, and the slide, S *s*, being shifted backward or forward, as the case may be. A stereo landscape lens, or ¼-plate portrait combination with diaphragms, may be used

Fig 1

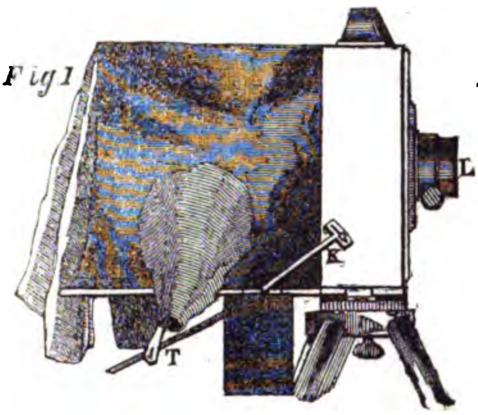


Fig 3

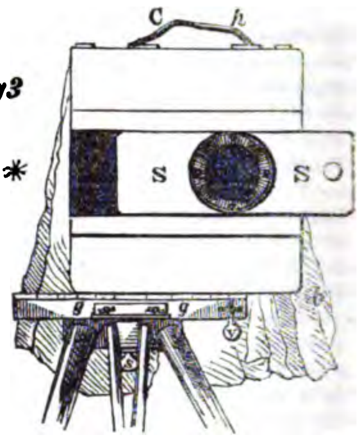


Fig 2

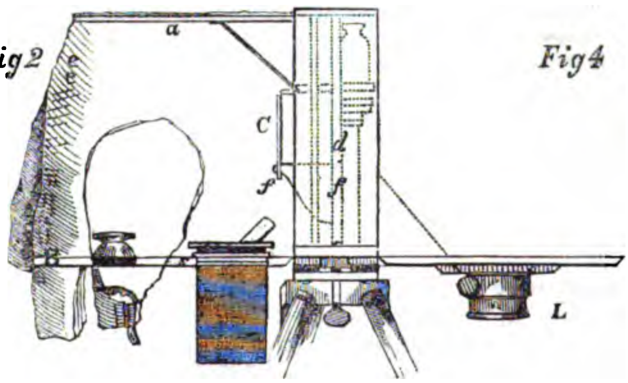
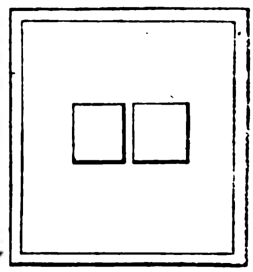


Fig 4



with this camera, according to the nature of the subject. The development is carried on in an ordinary tray, and the plate, being first washed with about an ounce and a half of water added to the decomposed developer in the tray, is brought out through the trap (T) into diffused daylight under the focusing cloth, and is there completely washed and fixed.

The whole of the manipulation with this camera is exceedingly simple; and to myself, who have successfully worked with it for the past two years, and not unfrequently in places where it would have been impossible to "pitch a tent," the camera now exhibited has proved a real treasure. The front takes down, as shown by diagram 2, and the bath-tray, lens, bottles, cloths, &c., all pack into the front of the camera, as the tent packs into the back. The entire weight of the apparatus *packed*, including lens, and everything that can be needed except glass, is twelve pounds; and it may be carried as a portmanteau by the strap (*h*, fig. 3), or as a knapsack by shoulder-straps attached to the upper part of the instrument.

I apologize for troubling you with so lengthy a description of what may, after all, be considered of little interest. CHARLES ALFIERI.

P.S. The camera can be set up or taken down in five minutes, and may be moved about from place to place without packing up.

Photo-lithographic Printing.

To the Editor of the Photographic Journal.

Melbourne, January 16, 1860.

SIR,—The readers of your valuable Journal will doubtless be interested to hear of the progress photographic science is making in this distant part of the world, and will sympathize with any efforts to extend its usefulness, impeded as such efforts are by many difficulties of which scientific men at home know nothing.

Mr. Ligar, the Surveyor General of Victoria, impressed with the great benefit which would result from the successful application of photo-lithographic printing to the production and publication of plans for the sale of land, and maps for general purposes, induced me to undertake a series of investigations calculated to realize the advantages he sought.

The result has been a photo-lithographic process, practical in its details and substantially new, which has been adopted in the Government Survey Department, and admits even at present of very extended application, the limit being the size of the camera employed, not the nature of the invention. The following is an outline of the process found best adapted for the production of maps and plans:—

A negative is produced in the usual way, bearing to the original the desired ratio, as one-third, one-fourth &c., accomplished by placing the camera at the necessary distance from the map to be copied.

A positive is printed from this negative upon a sheet of paper so prepared that the image can be transferred to stone, it having been previously covered with greasy printers'-ink. The process of transferring is accomplished in the ordinary way; and the drawing upon stone thus obtained is exactly similar in character to all lithographic delineations of the kind; the subsequent printing-process is also proceeded with as usual.

The time employed in copying and reducing, and getting the copy or reduction *into* the stone, is very short; so that it is possible to receive a number of surveyors' plans in the morning, reduce and transfer them to the stone, and return by the evening post the requisite number of lithographs of each.

Mr. Ligar's kindness enables me to forward you some impressions of a little map for circulation amongst your subscribers; it is a reduction of the "Specimen Plan" published by the Surveyor General for the instruction of the surveyors in the field, with a view of ensuring a uniform and suitable style of drawing. The reduction is to one-third of the original, and no retouching has been resorted to; you will also perceive that four "transfers" have been prepared from the same negative, enabling four impressions to be printed upon one sheet at every pull of the press. J. W. OSBORNE.

A dark Spot in the Centre of the Picture.

To the Editor of the Photographic Journal.

SIR,—Permit me to thank your correspondent "Onward" for his letter on the above subject which appeared in your last Number. His explanation is very good and satisfactory, and confirms my previous notions on this subject, published at various times. One cause of a dark spot in the centre of the picture is, no doubt, internal reflexions at the surface of the front lens; and even when no such lens is used behind the stop, light, internally reflected in this way, produces flare upon the picture. There are other causes which contribute to the effect; but I now agree with "Onward" that the chief cause of the evil is that which he has described. His experiments have been more searching and complete than my own, and I think they leave no doubt on this subject. THOMAS SUTTON.

To the Editor of the Photographic Journal.

SIR,—Will you kindly correct a misprint which occurs in the "Theory of the Panoramic Lens," published in your last Number?

Equation (5) should read thus—

$$\frac{1}{v_1}-\frac{1}{v_3}=2\,\frac{m'-m}{m'r} \quad \ldots\ldots\ldots \quad (5)$$

And in the next line it should be stated that v_1 and v_3 are eliminated between equations (1), (4), and (5).

I regret that in correcting the proof they escaped my notice. THOMAS SUTTON.

CORRESPONDENCE.

All communications for the 'Journal,' and on business relating to the Photographic Society, may be addressed to the Secretary and Editor at Messrs. Taylor and Francis's, Red Lion Court, Fleet Street, E.C.

The Rooms lately occupied by the Society at No. 1 New Coventry Street, W., are now entirely closed.

Cornish Chough.—The specimen of collodion sent has acted perfectly well in our hands for negatives; it appears rather too strongly iodized for the production of positives. There must therefore be some other cause than the collodion, to produce the effects which you de-

scribe. A letter addressed to our publishers will receive an immediate reply if you will forward a specimen of your failures. Many thanks for your very interesting native ores.

Sir,—I should feel greatly obliged if you or any of your readers would kindly give me a solution of the following difficulties:—1st. How are large sheets of paper albuminised so as to secure an even layer of albumen from top to bottom? I find that for an inch or two at the top the albumen is very thin, and increases in thickness to the bottom. 2nd. Is there any process adopted of rolling after albuminizing? I can obtain the same *gloss* as the manufacturers, but I cannot obtain so *smooth* a surface. Thos. Edge.

The sheets of paper are merely floated on albumen and suspended. No after-pressure is used, but the gloss is often increased by the admixture of gelatine: paper so prepared soon changes colour after it has been excited. Very large sheets we have also seen covered with albumen by means of a flat hair brush, using so as to cross the paper at right angles, then allowing them to lay flat until nearly dry, when a moderate heat may be applied for the purpose of acceleration.

An Exhibitor.—The Photographic Society have nothing whatever to do with the sale of photographs at their Exhibitions. The keeper of the Gallery has been in the habit of disposing of such works as exhibitors may have wished to part with. It entails considerable trouble, and is a matter of his own private arrangements. Any per-centage upon the amount sold he is certainly entitled to for his care and extra labour.

Sir,—I am now working the collodio-albumen preservative process, and am succeeding with it to my entire satisfaction—with one exception: I cannot get distant objects. However distinct they may be on the ground glass, they are yet feebly impressed on the plate. Is it possible to get both near and distant objects (from ½ a mile to 2 miles distant) sharp and well defined together? My skies are always weak: as I expose for the shades, they become solarized; and all distant objects become also weak, and blend so insensibly into the skies that I cannot paint out the latter. I fancy I may have been using *too little* silver in developing. I have always been cautioned against the too free use of it, and fear I may have got into the other extreme. Most operators recommend not more than a few drops to each ounce of gallic-acid solution; and this is about the quantity I have used; but, on looking over Mr. Hardwich's Manual, I find he advises that *not less* than ½ *a drachm* (30 drops) of a 20-grain solution should be used to each ounce of gallic-acid solution; he says that otherwise defective development in the high lights will be encouraged. Does not this seem a very large quantity? And suppose that the picture had been slightly under-exposed, would there not be a tendency to over-develope the high lights before the details of the shadows could be brought out, if so large a quantity of silver were used? Could any mechanical means (say a funnel in front of the lens) be applied, so as to prevent the skies and distant objects from being over-done before the foreground was thoroughly impressed? H. Y.

Much the same effect is produced, whether you work with dry or wet collodion, arising from over-exposure of the feebly represented parts. You will not do wrong by using the nitrate of silver freely, provided you do not find rapid decomposition of the developer take place. The late Mr. Archer contrived for his camera a sort of fan, turned by a small winch outside the camera, so as to raise it from the bottom, and thus to gradually shut off the sky and upper parts of the picture. By a little practice he was enabled to succeed in giving natural clouds to the pictures: some of these productions he exhibited in Pall Mall; and they were much admired.

R. G.—Some samples of paper decompose after excitement much more rapidly than others. It seems to be frequently caused by the paper itself. Dryness greatly tends to preserve it, and it may be well insured by the use of Messrs. Marion's patent cases for this purpose.

A Slow Hand.—Apply to Mr. Skaife; his contrivance for opening and closing the lenses is very rapid, and quite effective. Mr. Shadbolt, at the late Meeting of the Photographic Society, also described a cheap and easy mode of rapid exposure. Some years since, we saw in the hands of an amateur a contrivance by which a dark spring blind, like a miniature window-blind, passed over the lens, having a small aperture cut in it. The results were very good; and the advantage was, that all parts of the picture were *equally* exposed, however short the duration.

J. H. Slater.—If you wish to secure the representation of clouds, use lenses of a double combination, giving very rapid exposure. The front of your camera should be made capable of being raised, or you will have too much foreground.

H. A. D.—There was a prospectus of a Foreign and Colonial Photographic Company (limited) issued about two years since. They proposed to fit out an expedition for the practice of photography in different parts of the world, and gave a detailed estimate of their expenses, &c. A Committee was formed, a gentleman at Exeter being Secretary *pro tem.*

A. F.—Like yourself, many of our friends have inquired respecting M. Joubert's kind promise of a specimen of his process of printing, for this Journal. We explained the cause of delay in our last; and M. Joubert, as will be seen from our report of the April Meeting of the Society, leads us to hope that it will be given with our Number for May.

Sir,—Some time since, I added 12 oz. dried carbonate of potash to 4 pts. of alcohol of sp. gr. ·838, or about it: is the clear supernatant liquor fit to add to collodion? If not, is there any acid that may be used to decompose the alkali, and at the same time produce a salt not injurious to iodized positive collodion?

I would also ask whether a glutinous and rather contractile collodion does not keep longer when iodized than one made with hot weak acids? Ralph.

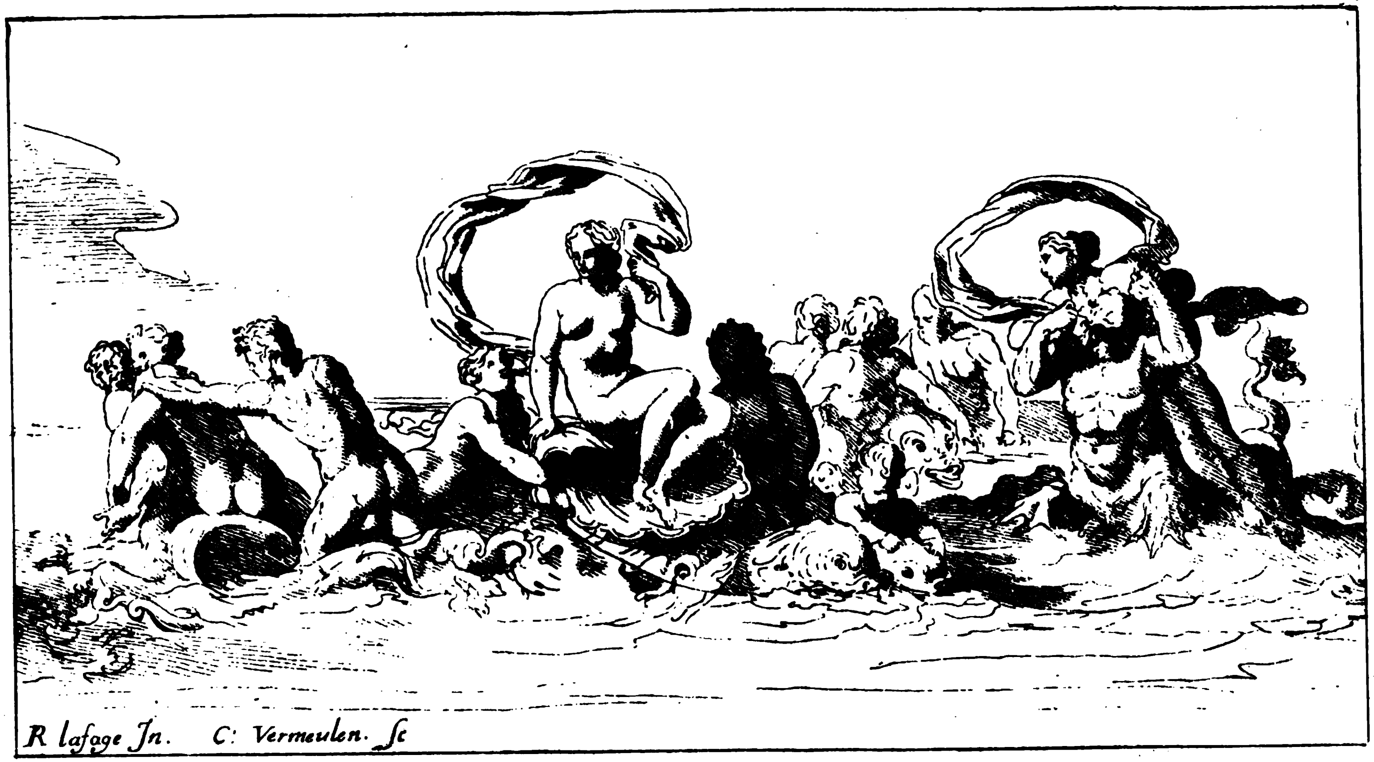
1. The alcohol is perfectly fit for use. Your carbonate of potash should have been *perfectly* dried. 2. A collodion which is *glutinous* can hardly be *contractile*. The keeping qualities of collodion seem to depend very much upon the sample of ether used, as well as on the character of the pyroxyline.

Mr. King, of Milsom-street, Bath.—To report on the varnish you have sent would be exceeding our duty, and an injustice to other manufacturers. We must refer you to our advertising columns. You may rely on success attending the manufacture of any truly useful photographic agent.

We are sorry that our limits prevent us from printing the lecture of Mr. Burman before the "Douglas Useful Knowledge Society" in the Isle of Man. It seems to have been well attended, and to have created considerable interest in the island.

With the present Number our Subscribers will receive the copy of a plate by the zincophotographic process, printed at the Ordnance Survey Office, Southampton, under the direction of Col. Sir Henry James, F.R.S. Notwithstanding we now give an extra half sheet, several communications in type must remain until our next Number.

Letters of inquiry to the Editor can be answered only through the medium of Answers to Correspondents.



Copied and Printed by Photo-zincography at the Ordnance Survey Office Southampton.
April 1860.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 97. MAY 15, 1860.

In our last Number we inserted a communication from Mr. Osborne, of Melbourne, on Photo-lithographic Printing; since its issue, Mr. Osborne has presented us, for distribution amongst our subscribers, a "specimen plan," published by the Surveyor-General of the Colony. The number sent does not equal our circulation, but the majority of our subscribers will be accommodated; and we trust that, by Mr. Osborne's liberality, on a future occasion we shall be able to complete our issue to those subscribers who do not receive the print with the present Number.

On the Reduction of the Ordnance Plans by Photography, and Copying and Printing by Photo-Zincography.

Photography.—The circumstances under which Photography was adopted for the reduction of the Ordnance plans have been stated by Colonel Sir Henry James, F.R.S., in a letter to Sir R. Murchison, the Chairman of the Committee appointed by the Secretary of State for War, to report upon the accuracy of the plans reduced by Photography. This letter, which is dated 11th Jan. 1859, is printed with the Report of the Committee, and we take the following extract from it:—

"The Government having decided that the Ordnance plans should consist of the following series, viz.,

"1st, Towns on the $\frac{1}{500}$ scale, or 42 inches to a mile;

"2nd, Parishes $\frac{1}{2500}$, or 25·344 inches to a mile;

"3rd, Counties $\frac{1}{10560}$, or 6 inches to a mile;

"4th, Kingdom $\frac{1}{63360}$, or 1 inch to a mile; it became necessary that the plans of the Towns should first be reduced to the scale of the Parish plans, and then the Parish plans to the scale of the County plans, and again the County plans to the scale of the general map of the Kingdom.

"I had, therefore, anxiously to consider what arrangements could be made by which the cost and time of making these several reductions could be diminished.

"It was obvious that, unless some more expeditious and economical method could be devised than by the use of the pentagraph, the publication of the Survey on the several scales required would be spread over a period of time which would be most unsatisfactory to the public, both on account of the delay and the expense."

Sir Henry James estimates that it would require at least sixteen pentagraphs with forty draughtsmen to make these reductions; but as the employment of so many draughtsmen would necessitate a great increase to the office accommodation and superintendence, all leading to increased expenditure, he resolved to try Phography, although, as he says, he was discouraged by the photographers he had previously consulted.

The Report of the Committee gives us the result of this happy application of the art of Photography. Nothing can exceed the beauty or accuracy of the reduced plans—the greatest error in any part of the plan not exceeding the $\frac{1}{400}$th part of an inch; and whilst the saving in money amounts to no less than £2086 a year, the whole work is performed by two sappers of the Royal Engineers, and the required reductions are made immediately after the original plans on the large scales are finished, so that the actual work of making the reductions causes no delay whatever.

An account of the methods employed for the reduction of the Ordnance plans having been previously drawn up, for the use of the officers employed on the survey of India, by Captain

A. de Courcy Scott, R.E., under the direction of Colonel Sir Henry James, the Committee have printed it with their Report; and we have of this account not only the plans and sections in the building expressly erected for the purpose at Southampton, but also drawings and descriptions of the whole apparatus employed, as well as examples of the reduced maps made at the Ordnance Survey Office.

The reduction of plans by Photography was first introduced by Colonel Sir Henry James in 1855, and an account of the method then employed, with examples of the reduced plans, is given in his annual Report to Parliament for the year 1855-6. Since then it has been very generally adopted in all the Government Topographical establishments in Europe; and in a future Number we purpose giving some interesting details, with illustrations, on the subject.

Photo-Zincography.—Before we can fully appreciate the importance of having a method by which the reduced drawings can be transferred at once to zinc, or the waxed surface of a copper plate, it must be remembered that the Parish plans are printed from zinc plates only, and that the County plans and the sheets of the general map of the Kingdom are engraved on copper.

It is therefore obvious that, after the reduction has been made by photography, the reduced drawing must be traced by hand to make the transfer either to the zinc or copper plate, and that any method by which the reduction could at once be transferred, would save the cost, delay, and liability to error in making the transfer tracings.

The officers employed upon the Ordnance Survey therefore next addressed themselves to the solution of this difficulty, and by adopting the method of exposing a sheet of paper coated with a wash of the bichromate of potash and gum under a collodion negative, and afterwards coating the entire surface of the paper with lithographic ink, and then removing the ink from every part excepting where the lines or letters are on the insoluble and adherent portion of the bichromate of potash, they have perfectly succeeded.

In practice it is found best to coat the paper with ink in a dark room, and immediately it is taken from the printing-frame; and this is done by passing it through the press on a zinc plate charged with ink, as the paper is then perfectly and evenly covered with the ink, and all further action of light on the composition prevented. After this is done, the paper is turned over on a plate of glass, and the back of it moistened with gum and water, which, passing through the paper, dissolves the gum and soluble portion of the bichromate of potash to which the ink adheres, whilst it does not affect the insoluble portion on which the lines and letters are.

The hold of the ink to the blank parts of the drawing or writing having thus been destroyed, its removal is effected by again passing the paper through the press on a plate of zinc charged with ink. This second coat of ink adhering to the ink on the whole surface of the paper, brings away with it all that was on the blank parts, whilst at the same time it leaves a second charge of ink on the lines or letters.

It is scarcely necessary to say that considerable skill is required to effect this object so perfectly that every particle of ink shall be removed from the blank parts without breaking the finest lines, or those which it is required to preserve.

For the transfer to zinc the anastatic process is used; and so perfectly charged are the lines and letters with ink, that two or even three or four plates can be produced from one and the same photograph; and thus the power of producing fac-similes of any MS., either on the same, or a reduced, or an enlarged scale, and at a very trifling cost, is unlimited.

The paper employed is of a fine texture and nearly transparent, and is known as engravers' tracing-paper.

For the transfer of these photographs to the waxed surface of the copper, it is necessary that the paper should be transparent, in order that, before rubbing it down, the reduced drawing should be accurately adjusted to the marginal lines and the trigonometrical points, which have been previously laid down on the copper plate, and thus obviate the possibility of any distortion; but independent of this, the finer the paper and the smaller the quantity of gum, bichromate of potash and ink employed, the better—for the photo-zincograph will be proportionally sharper and clearer.

By the courtesy of Sir H. James our readers were enabled to possess a specimen of this process, printed with the last number of the Journal.

A photo-zincographic copy of an ancient MS. from the Record Office is also given in Colonel Sir H. James's annual Report to Parliament for this year, and the public have therefore the means of seeing the perfect manner in which the ancient records of the Kingdom can now be faithfully copied by this process; and as the cost is very trifling in comparison to the methods hitherto employed, it is to be hoped that copies of these so long locked-up records will soon be given to the world, and some transmitted to those distant colonies in which the people of this country have established themselves, many

centuries after those records (which may contain notices of their families and the properties formerly held by them) were written.

*** We have lately seen some copies of modern and ancient printing, executed at the Ordnance Survey Office under Sir H. James's direction, which surpass in beauty the above specimens, and require very accurate observation to distinguish the reproductions from the originals. It is evident that the most choice specimens of our ancient masters may be reproduced in a marvellous manner.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

PHOTOGRAPHIC SOCIETY OF LONDON.

ORDINARY GENERAL MEETING.

TUESDAY, MAY 1, 1860.

HENRY WHITE, Esq., in the Chair.

The Meeting took place in King's College.

The CHAIRMAN expressed his regret at the absence of the President, whom the Members had been led to expect would be present on their first occupancy of their new abode, and informed the Meeting that his Lordship was absent from unavoidable circumstances.

The Minutes of the last Meeting were then read and confirmed.

The following gentlemen were elected Members:—

Captain R. L. PLAYFAIR, and GEORGE LAVIS, Esq.

Mr. SHADBOLT exhibited two negatives taken by the aplanatic lens, including an angle of 60°.

Mr. HARDWICH then read the following paper:—

On the Value of Collodion as a Photographic Agent.

WE are met together this evening for the purpose of discussing the merits of a formula for negative collodion, which a Committee of your Society have reported on. It will be still perhaps in your recollection that the original suggestion for the appointment of such a Committee emanated from me, and therefore I think that I am in order in desiring to open this Meeting with a few introductory remarks. There are Members of our own Society, and also of other Societies, who have expressed themselves as dissatisfied with the course which we have pursued, but I think that it will be easy to justify that course on the ground of necessity. The subject was not only one of great importance, but was much in need of further elucidation. Let me take these points in order.

1. The subject of collodion was one of fundamental importance to Photographers. Some doubted this at first, and conjectured that in a very short time a material would be found as superior to collodion as collodion is to paper. Several years, however, have elapsed, and nothing of the kind has been discovered. Further than this, we may affirm that the more complete our knowledge becomes, the greater the difficulties appear of superseding collodion by a vehicle more adapted to fulfil the requirements of the art; for the photochemical properties of iodide of silver are so much affected by the exact condition in which its separate particles are precipitated, and likewise by affinities exerted towards it by other bodies, that the list of substances available as supports for that iodide is considerably reduced. Before we can select any film, it must be decided that it has certain facilities for penetration by liquids, and that the movement of the particles of iodide will not be interfered with by reactions other than neutral, such as many bodies, organic and inorganic, are known to possess. The question arises then, whether collodion is not *the* particular substance which photographers require; if so, we cannot be at too much pains in bringing it to perfection. I have heard it said that in the chemical laboratory we should be constantly at a stand-still without a fluid metal, and that *therefore* we have a fluid metal, viz., mercury. So in photography, since we require a support for the sensitive iodide of silver, we have a substance which is calculated to answer as a *support*, and that substance I believe to be collodion. If the Members agree with me, they will see that the appointment of a Committee to inquire into the best mode of manufacturing collodion was a proper step for the Society to take.

But, 2, the question of collodion is not only important, but difficult, and to a far greater extent than at first appears. This assertion has also been doubted, but nevertheless it admits of the most satisfactory proof. Those only who have manufactured collodion in large

quantities, and have continued the manufacture for a long time, are fully aware of the strange anomalies which may arise. Just when they have begun to esteem their process perfect, a new difficulty starts up; and if this be disposed of, it is by and by succeeded by another. In the early days of collodion photography a little manual was published by Mr. Hennah of Brighton, which rapidly passed through four editions, and was much prized by amateur practitioners of the art. In one of these editions—I think the third—we find the author apparently satisfied with the collodion process as it then stood, and pronouncing it nearly perfect; but in the succeeding editions he is compelled to put in a footnote qualifying his previous statement, and speaking of the art as, after all, but in a transition state. "The great impediment," he says, "is the absence of a collodion of uniform character. A remarkable and almost unaccountable difference is commonly observed in the degree of sensitiveness to light of different samples of collodion, independently of the iodizing solution used; and it is believed that more remains to be done in the preparation of a good collodion than in any other branch of the process, for there is no doubt that most of the superiority of this over other methods is due to the little-understood properties of the collodion itself. All who have the time are earnestly recommended to give their attention to the perfecting of collodion, as the most likely means of rendering this beautiful art not only more popular, but also of extending the range of its usefulness far beyond anything it has yet reached."

I have quoted the above remarks, as according with my own views and because their author is known in this Society as a good and candid observer. If it be objected that the book to which I refer was written five years ago, I would say that, as far as any information on collodion in the possession of the Society is concerned, it might have been written six months ago; for although individual makers of collodion have improved its quality, their improvements will not be found in the pages of the Society's Journal; and this consideration brings me to my third and last point, viz. the insufficiency of our published information when this Committee was appointed.

In making the assertion that the Journal of the Society contained no complete information on the manufacture of photographic collodion, I do not mean for one moment to ignore the valuable papers of Mr. Hadow and others, to whom I have on many occasions acknowledged my obligations. I simply wish to observe that there was not in the Journal such a full and minute description of the commercial manufacture of collodion as would enable an intelligent person to prepare a gallon or two gallons of that substance per diem, and to compete, as regards quality, with makers who have acquired a reputation for producing a good article. I may, however, go further than this, and affirm that any individual desiring to become a manufacturer of collodion would, by many communications contained in our Journal, be entirely led astray. It is true that, appended to these communications, we have a distinct announcement that the Society is not responsible for the correctness of the views entertained by the authors; but are we to pass our whole existence in this negative state? and will the public, who look to us to advance the interests of the art, be satisfied by our simply collecting all that comes to hand, and putting it into the Journal, with the above reservation? What they require is something for which the Society *is* responsible; and therefore, since it is well known that we have amongst us members who understand what a really good collodion ought to be, it was most natural and proper that those members should come forward and make a report? If any one thinks differently, let him state in what manner he would advise the Society to expend its funds, and to attempt the fulfilment of the expectations which have been formed of it. It has been said that to legislate on a question in which different makers have to compete and exhibit their skill is wrong; and so no doubt it would be if these makers worked by one and the same formula: but if it can be shown that a new principle is involved in the formula to be reported on, the aspect of the matter changes. It would be premature to attempt at this time to prove that the collodion now before the Society differs fundamentally from other collodions, but at a later period of the discussion this evening I shall be happy to do so. Admitting such to be the case, we are certainly in the right path; and if our efforts to give a definite formula for collodion be crowned with success, the oft-repeated inquiry, What does the Photographic Society do for the advancement of the art? will be replied to for the present

The CHAIRMAN suggested that the discussion on the Collodion Report should now be proceeded with, and as Mr. Malone had formerly expressed a wish to make some remarks, perhaps he would favour the Meeting with some observations.

Mr. MALONE observed that after so direct an appeal he could not refuse to rise, but he begged to state that

to be those best adapted for general purposes. With less alcohol the film is more contractile, and more prone to dry up after sensitizing. With a larger proportion of alcohol, say two parts of alcohol of ·805 at 60° to one of ether of ·725, the sensitiveness is impaired. A friend, whose judgment is quite to be relied on, has used more than two gallons of my collodion prepared with excess of alcohol, and he assures me that it is remarkably well adapted for coating large plates, and is sufficiently sensitive for copying works of art and for landscapes: nevertheless I do not recommend this formula in preference to the other for a normal collodion, seeing that we have no means of increasing sensitiveness when it proves deficient.

I have tried the effect of varying the strength of the alcohol from sp. gr. ·805 to ·820. When the ether and alcohol in the collodion are used in equal parts, the latter must not be in what is termed the absolute state (sp. gr. ·805), or the film will be more or less impervious to liquids, like gutta percha, if the particular pyroxyline which I advise be adopted. With alcohol not stronger than ·820, the collodion works well at first, but becomes rather thick and non-adherent towards the bottom of the bottle. I therefore take an intermediate strength, by using alcohol of ·805 for the plain collodion, and alcohol of ·817 for the iodizer.

The quantity of iodide of potassium in collodion made by this formula ought not greatly to exceed 3½ grains to the ounce, or there will be peculiar markings on the surface of the iodide of silver at the lower corner of the excited plate. The purer the pyroxyline, the greater the chance of the iodide being in excess; but nevertheless, if the above-mentioned quantity should produce a film more opalescent than the operator desires, it will be in his power to give additional creaminess by introducing a little iodide of cadmium, without any danger of the iodide bursting out upon the surface and producing the marks before described.

In the Report of the Collodion Committee recently published, I think that an erroneous impression is conveyed as to the length of time this collodion will keep after iodizing, which may have resulted from several Members of the Committee having worked in a bad light. Certainly there are some varieties of pyroxyline which displace iodine from iodide of potassium less rapidly than the pyroxyline which I advise; but there are others which do so more rapidly, and hence the position of the collodion as regards keeping properties is intermediate. It is also in our power to increase the stability, by using the mixed iodides of potassium and cadmium instead of the iodide of potassium only, after which the collodion will retain a fair share of sensitiveness for many weeks.

The cadmium iodizer has not the marked effect in glutenizing this collodion which it is known to exercise with some other kinds; and when the nitrosulphuric acid is used at the weakest point possible, the resulting collodion, iodized with cadmium, will be quite manageable even on glasses of considerable size.

White spots have been spoken of in connexion with the potassium iodizer. My experience leads me to believe that they do not depend upon any insoluble particles, but are due to specks of dust adhering to the film. I find the same spots oftentimes in collodion containing only iodide of cadmium; and since the mixture of ether and alcohol given in the formula is capable of dissolving 4 grains of iodide of potassium to the ounce, it is not easy to understand how there can be any insoluble particles when only 3½ grains are employed.

In proposing the pyroxyline mentioned in this paper as a good commercial form, I would call attention to the tenacity with which it adheres to the glass. It has been pointed out to me that the collodion, after keeping for a time in the iodized state, is well fitted for use in Taupenot's process, and does not show any disposition to rise in blisters beneath the albumen.

The principal fault which I found in this collodion during the last summer was the occasional occurrence of fine black lines, showing on the finished picture in the direction of the dip. They are most abundant when the pyroxyline is made in rather concentrated acids; and by increasing the quantity of water in the nitrosulphuric acid, are nearly removed. Much may therefore be expected from the use of potash as a cleansing agent to the cotton, since a weaker nitrosulphuric acid can then be employed without causing solution of the fibre.

The foregoing paper is incomplete in one point, viz. in not describing the effect of leaving the cotton in the nitrosulphuric acid for a longer or shorter time. My experience has been, that a short immersion gives a product at least 15 per cent. heavier, but dissolving in the ether and alcohol with a larger amount of sediment, and yielding a slightly less limpid collodion.

On the Manufacture of Collodion.

By Robert Freeman Barnes, Esq.

The following paper contains experimental matter in connexion with Collodion calculated to be of more or less value to those interested in its manufacture.

borne in mind also that he could not tell, when he obtained a piece of cotton, how far it might be affected by oil or other impurities. Chemists could not take anything for granted, but, when they wanted to secure successful results, they should treat the cotton with acids and with alkalies, in order to get it as definite as possible before using it. If, for instance, when it was treated with caustic potash till the potash no longer showed a yellow colour, the result would be that it would not dissolve in acids which otherwise would have dissolved it. In the experiments named by Mr. Williams it was possible that the cotton might be a wrong variety, or it might be improperly cleansed, or it might have been imperfectly dried after cleansing, which was a very important matter; or there might be an error in the acids. It was impossible for him to determine which was the cause of failure; it might be any one of these, or it might be every one of these causes combined. The process was a very nice one, but, with good and proper instruments, it was easily worked.

Resuming the subject of his own experiments, Mr. Malone said! The cotton remained in the acids ten minutes, and they were tried by one of Mr. Newman's thermometers: and he might observe, that a standard thermometer was a very valuable instrument, and he believed that Mr. Newman valued his thermometer at twenty guineas at least. Although he did not recommend Members to give twenty guineas for a thermometer, yet he recommended them to have their thermometers compared with a standard thermometer, for doing which there was an arrangement at Kew Observatory. [Mr. Malone then exhibited some of his pyroxyline, which, he remarked, was not particularly rotten: it cohered well.] He took 5 grs. of this cotton, put it to half an ounce of alcohol of the specific gravity of ·806, distilled off chloride of calcium, and half an ounce of ether of the specific gravity of ·725, in which mixture it dissolved. Although in the manufacture it might not be necessary to have everything absolutely pure, still, if the acid or ether contained oxidized or ozonized particles, the result would be unsatisfactory. The ether, a very good chemist had told him, should be neutral; but Mr. Hardwich believed that the ether ought to be alkaline: at least he had found it so. The cotton was washed some hours in ordinary water. Of course, theoretically, he should recommend distilled water, yet, in practice, he did not find it to be necessary; and he agreed with Mr. Hardwich that it was not desirable unnecessarily to refine upon a process. The 5 grs. of pyroxyline being dissolved in the ounce mixture of alcohol of the specific gravity of ·805 or ·806, and ether ·725, he added 2 grs. of iodide of potassium and 2 grs. of iodide of cadmium: and here he might remark that all chemicals were not to be found of the best quality at one place; for instance, if the best iodide of potassium were to be obtained here, it might be necessary to go elsewhere for the iodide of cadmium to get it soluble. He made that remark, not for the purpose of over-refining, but to show those at the head of the trade the importance of not leaving these matters entirely to assistants. Chemists should not trust their assistants to say that their iodide of cadmium was perfectly soluble, or that the nitric acid did or did not contain chlorine, or the iodide of potassium carbonate of potash. At the same time it must be remarked that amateurs must be prepared to pay the best price for the best articles.

[Mr. Malone then demonstrated to the Society that the process was as he had stated, by putting some ether and some alcohol into a bottle, and then immersing some of his pyroxyline, which became entirely dissolved; and then he observed that the collodion which he thus obtained made a perfectly clear and tenacious film.] Such was the result obtained by the formula which had been made public by the communication of Mr. Hardwich, and which he considered to be of great importance to the photographic world, notwithstanding the entertainment of a contrary opinion by other persons, and notwithstanding a neighbouring society had taken the parent Society to task, alleging that it did not know what it was about in this matter. He (Mr. Malone) would tell that neighbouring society that the London Society knew perfectly well what it was about, and that no one else had given the minute information which Mr. Hardwich had done, and by which he (Mr. Malone) had been enabled to make an excellent collodion, as might all other persons. He confessed that he believed Mr. Hardwich felt rather galled at the remarks which had been made. Another maker of collodion, for instance, had said, some time ago, "If it were not for me, photographers might shut up shop!" No doubt that gentleman was very lucky to have hit upon a good collodion by empirical means by rule of thumb; but if he were to shut up shop to-morrow, photographers would still be able to obtain as good collodion, and by the process published by Mr. Hardwich. He (Mr. Malone) did not recommend all photographers to make their own collodion; on the contrary, he recommended them to go to a respectable maker. But the importance of the formula was not lessened because it was not desirable for each individual to become his own collodion manufacturer. The reason the Society published the Report was that it found a really good thing. It was not for him to speak in praise of the Committee, but he ventured to think that they had acted candidly in bringing forward all the points that struck each of the Committee. There *were* other formulæ sent in, but they were imperfect. There was one in which the author had not made up his mind as to his formula, and recommended the Committee to try this or that; but this was not the business of the Committee; the gentlemen composing that body had not time to devote to the task of perfecting a formula. They had simply to inquire into the characteristics of formulæ as they were presented to them. Another formula sent in contained a fundamental objection. He believed that any formula that recommended paper as a base ought not to be received or considered. The gentlemen who sent it in said, if they took Swedish filtering paper they would obtain that which chemists knew to be a good cellulose. Any person acquainted with the manufacture of paper, as he (Mr. Malone) happened to be in an earlier period of his life, knew perfectly well that it was impossible for any person to tell what were the constituents of a piece of paper, and how far they might differ from another piece nominally of the same manufacture; in fact, it was a heterogeneous mass, some portions of which were soluble and others not. He knew an instance of a gentleman who had succeeded perfectly in making collodion with some Swedish paper; but, on taking another and fresh batch of it, and treating it in precisely the same manner, it entirely failed. With regard to the sensitiveness of the collodion, various observations had been made; and, even in the body of the Report, one gentleman stated that he had obtained a collodion twice as sensitive as that of Mr. Hardwich. The Committee had been taken to task through the contradictory nature of the Report; but that apparent contradiction, to which exception was taken, only showed the honesty with which the Committee had conducted their investigation. He (Mr. Malone) did not know what accident might have happened to that gentleman, but he did not doubt for a moment his belief in his statement to be true: but had he shown us such a collodion as to be twice as sensitive as Mr. Hardwich's? Could he show it? He had not shown it, and Mr. Malone thought he could not show it. If it could be obtained, it would be immediately advertised from one end of London to another.

If preferred, the cotton may be well washed in renewed quantities of distilled water without the addition of the chloroform, and dried as before. It is then better adapted for use with the accelerator hereafter described.

The acidity of the ether varies greatly in different samples; and although in some cases it is but very slightly acid, it is generally sufficiently so to destroy one of the important properties of collodion.

To correct with the alkalies usually employed, as ammonia, &c., although sufficient for the time being, only tends to its early decomposition, and the film is destroyed and rendered powdery in character.

The method I adopt to correct the ether is very simple and efficient, and possesses no disadvantages. Take one pint of pure washed ether with which half an ounce of absolute alcohol has been previously mixed, and add to it the white of a newly-laid egg. The mixture must be violently shaken up, and kept in a state of agitation for some time. The alcohol assists in the coagulation of the albumen, which takes place in about five minutes; but the proper action is not accomplished if too much alcohol—say one ounce—be at first added, as in that case the albumen coagulates so rapidly as not to leave time to the ether to become thoroughly digested with it. After shaking it up for several minutes, add two more ounces of absolute alcohol; this will entirely coagulate the albumen and precipitate it in a mass, so as to allow the ether to be readily decanted off perfectly clear. The ether may remain in contact with the albumen forty-eight hours before decantation. Being but slightly alkaline, the albumen produces upon the ether the desired effect without decomposing the cotton afterwards dissolved in it.

The effect produced upon the ether is remarkable. Sufficient ammonia is liberated from the albumen to neutralize the small trace of acid present, and, providing the gun-cotton is perfectly prepared, the resulting picture is beautifully transparent in the shadows, the film is considerably strengthened, and the sensitiveness increased.

The negative developes with great purity of action throughout the entire body of the film, and the desirable roundness and beauty are produced, according to the brilliancy of the light. The most satisfactory results are obtained when iodide of potassium alone is used as the iodizing agent.

When the weather is very bad and foggy, as in winter time, extreme delicacy can be obtained by the addition to the collodion of chloric ether, in the proportion of one drachm to the ounce of collodion. Collodion treated in this way can be used when it would be impossible, from the state of the light, to obtain a brilliant picture by any other method. The shadows will be perfectly clean and transparent, notwithstanding the long exposure: in fact, for use in winter time, and for copying statuary, no collodion can be compared to it for clearness, delicacy, and safety in working. It will even give a brilliant picture with a foggy light. It is also well adapted for use in hot weather, and is not in the slightest degree structural in character.

In one of my experiments, having washed a portion of ether with milk and distilled water, I made with it some collodion, and tested it against collodion made with the same ether previously to its being so treated.

The milk collodion was the more sensitive of the two—in fact, it was the most sensitive I had ever tried; but it required a long development, and there was a tendency to fog, although the negatives might generally be considered as good in quality. The fogginess was more apparent when violent subjects were taken, and a long exposure was requisite to ensure softness. This experiment therefore had no other result but to convince me of the benefit to be derived by the use of organic matter in collodion, and to encourage me to continue my researches in the same direction. I had previously used butyric acid, but the result was unfavourable.

The substance I have now selected as an accelerator is cod-liver oil.

I had never been able to obtain an absolute amount of certainty with the sensitive collodions of commerce, as, independent of careful manipulation, they are all liable to decomposition of some kind in the back-grounds or other parts of the picture that interfered considerably with the photograph, which would otherwise have been perfection. Up to the present time, I have not found the accelerator produce these disadvantages. I have found the collodion in every case equally rapid after being mixed some time, whilst commercial collodion that had been iodized at the same period, and against which it was tested, had lost much of its primitive sensitiveness.

All these experiments have been very carefully carried out during the last three years.

Having passed in review the qualifications a good collodion should possess, and having given a few of the experiments made, I shall conclude with a formula for a serviceable collodion, which has been arrived at by a careful comparison of the results of my researches.

The gun-cotton and ether must be corrected according to the directions already given, and

It was a matter of ordinary common sense to know how to judge of criticism that must be interested. He gave up the wording of the sentence to suit Mr. Heath if it should be wished, but he (Mr. Malone) thought that they ought to accept the Report, and the Committee ought to be thanked for the pains they had taken and the desire they had shown to investigate the collodion of any one gentleman who would bring it before the Society. He believed that chemical science would derive great advantage from photographic science. For example, the question of ether needs further investigation. He ought to state that there was a simple remedy, if it were found that the cotton dissolved from too much water. What could be more simple than to take more cotton and put in more acid until it did not dissolve? It *was* a philosophical process, needing accurate manipulation if you took the formula just as it stood, and had no sort of check or rule of thumb to help you. With Mr. Hardwich's additional information, any one might succeed very well in making collodion to-morrow; and if iodized as he (Mr. Malone) iodized it, you might keep it iodized six weeks afterwards.

With regard to the challenge Mr. Heath had thrown out, he was delighted to receive it, but he could not understand why he had not brought his collodion before them. He, for one, should like to know where he could purchase that collodion. To him it was so astounding that he (Mr. Malone) threw back the challenge, and asked Mr. Heath to name this collodion.

Mr. Heath.—"It will not end here." Mr. Heath then asked Mr. Malone the real English meaning of "*unsurpassed sensitiveness*," for that really appeared in the Report.

Mr. Malone said that he contended that it was unsurpassed, and although he believed it, yet the Reporters did not assert collectively that it was so.

The Chairman said, he presided at the Meeting of the Committee at which the Report was settled, and it was criticised verbally throughout; he believed he might say that it was the result of the opinions and the labours of all the members present, who spent two hours in settling this Report; and he believed they should adhere to it verbatim, and not alter a single word. The Committee consisted of various members all over the country, each member working separately; and at the end of the year they were requested by letter to send in their individual reports. They did so, and Mr. Fenton, who drew the rough draft of the Report, incorporated in it the sentiments of the individual members. Objection had been taken to the statement that the collodion was unsurpassed in sensitiveness. It was the opinion of the majority that it was unsurpassed, and that word "unsurpassed" he thought a fair word. When the majority of the Committee said unsurpassed, they meant with regard to their previous experience; and he did not think that the trade, or Mr. Heath, or any one else, had a right to find fault with it. It was not stated as the opinion of the Society, but as the opinion of the Committee. Then, the last sentence of the Report was objected to. It was not the interest of the Society to encourage secrets. If the manufacturers of collodion do not choose to inform the Society how they make it, the Society must get the best formula they can, in which the whole process is described; and if Mr. Hardwich was good enough to communicate to the Society the mode by which it is made, and the Society found that it was a superior collodion, they had a right to say so. He did not read the word "superior" as Mr. Heath did; it was simply a superior collodion, just as Mr. Malone would say, a superfine paper.

Mr. Hughes said that, from circumstances of ill health, he had probably worked less than any other member of the Committee who had signed the report, and therefore he felt little hesitation in calling attention to the very emphatic remarks made by Mr. Heath on a former occasion, and repeated that night. In the Report the opinions of the individual members were fully expressed; for it was felt that a general laudatory report would do no good. Each person was required to give in his own report the defects which came under his notice, and these defects were noticed in the general Report. The faults were thus noticed individually, while the merits were only generally expressed. By the observations made, however, it appeared that the very candour of the Report tended to defeat its object, and that it was called contradictory, when, in fact, it was only just. Mr. Heath took exception to the appointment of the Committee.

Mr. Heath said that his statement was, that the Committee was appointed for a distinct and specific purpose, which that Committee could not carry out because formulæ were not sent, and therefore the Committee no longer existed.

Mr. Hughes would be sorry to have misrepresented Mr. Heath's statement, but he had certainly understood him to object to the appointment of the Committee, as well as to the making a Report, while he stigmatized the Report itself as contradictory and incorrect because it had no regard for the vested interests of the makers of collodion. Suppose the Committee had taken the collodion of A. B., for example, and had compared it with that of Mr. Hardwich, and reported in favour of the former. Then they would have published a mere advertisement for A. B., because his formula was not made known; and if he died and took his secret with him, no advantage whatever would accrue to the photographic world. On the other hand, if they had reported unfavourably upon the collodion of A. B., they would have been doing him an injury; he might naturally complain that, having held himself aloof from the Committee, they should have thought fit to single him out for their express disapprobation. Was the Committee to surrender its functions because only one formula was presented to it? and did that formula come from a person likely to give a valuable one? That was the point. If he (Mr. Hughes) did not belong to the Committee, he would say that it included among its members some of the most eminent names in the various departments of photography; the members had worked hard for many months, and their observations were entitled to be received with respect by any Society, and especially by that Society.

Mr. Malone coincided in the opinion just expressed by Mr. Hughes, and would state that it was not because other gentlemen sent in imperfect formulæ that could not be acted upon that the Committee was not to act upon the only complete one sent in. He was surprised that some one else did not send in a formula with something like philosophical precision, besides Mr. Hardwich. He was told not to expect that persons connected with trade would send in their formulæ. He knew that perfectly well, and he wished that gentlemen who were connected with trade would bear in mind that it was they who introduced the question of trade. The Society was comparatively a body of scientific men, and did not look at the subject from any but a high point of view. He had not the slightest hostile feeling towards any party, and he might say that was because he had no possible interest at stake. He deprecated personal discussions within the Society, as hostile to its best interests.

Mr. Hardwich said, at that late hour of the evening he would endeavour to be as brief as possible. He did not think there were many in that room who could exactly understand his feelings. The discoverer of the Collodion process was Mr. Archer; and all that he and others wished to do, was to suggest improvements in the manufacture; for the chemistry of the subject, as left by

Mr. Archer, was in a very unsatisfactory state. He (Mr. Hardwich) had been a maker of collodion for three years, and had prepared large quantities. About two years since, he manufactured collodion from linen, and sent it to India: he received letters saying that when it got there it was useless. He had also received a letter from a gentleman in the interior of Africa who had all his materials and apparatus out there, and after waiting six months for collodion (which in this case, he [Mr. H.] was happy to say, was not his collodion), found that it was perfectly useless; it turned as red as blood the moment the iodizer was added. On hearing these things, he (Mr. H.) consoled himself with the idea that the moment he had anything that could honestly be reported upon he would lay it before the Society. He had no desire that his name should appear so prominently in this business; if other makers would have come forward he would have helped them in every possible way. But he did not suppose in the first instance that they would come forward, nor was it to be expected. The work, however, had to be done; for he knew that many chemists and scientific men held aloof from the Society, saying that photographers drew fine distinctions between white and brown sugar, albumen of one kind and albumen of another, &c., but did not know how their most important chemicals were made. He did not wish to say that he had been made a martyr of; on the other hand, he was perfectly satisfied, and had been very successful commercially with this process. The formula was now before the Society; and if another manufacturer could produce anything three times as sensitive, he should be exceedingly glad to hear it; but he must say candidly that at present he had a firm conviction in his own mind that the assertion could not be substantiated. There was a difference of opinion evidently; and it remained to be shown who was right. The opposition this investigation had met with, might be explained by such differences of opinion amongst photographers [Mr. Heath: Hear!], since he had met with amateurs who could not understand the necessity for such an investigation. The members of the Committee, however, thought it quite necessary, and were satisfied that the Society would not be in a good position until every minute circumstance connected with the manufacture of collodion had been described. He could not say, however, that this had been done at present. There were still weak points. There was the manufacture of ether, for instance. It was well known that there were not more than three or four persons in London who made ether; so that part of the subject rested with them. He thought, if the Society spent £100 upon the investigation of ether, it would not be wasted. Then there were many sorts of cotton; and supposing those cottons to be equally cleansed, would they agree? It was his impression that they would; but cleansing and comparing seventeen kinds of cotton was a laborious operation to go through, and he had not done it. He would close his speech by saying that he was convinced the inquiry had done good, and that they were now in a better position than when the investigation was undertaken.

The Chairman announced that Mr. Dallmeyer, at the next Meeting, would read a paper on Distortion as produced by the present form of View Lenses, and on an Improved Construction of Lens free from this defect.

PHOTOGRAPHIC SOCIETY OF SCOTLAND.

Ordinary Meeting, 10th April, 1860.

Sir David Brewster, President, in the Chair.

The Minutes of the preceding Meeting were read and approved.

The Viscount Strathallan was elected an Ordinary Member.

On the table were pictures taken with Sutton's Panoramic Lens, and also a stereogram taken by the serum-of-milk Dry process, sent by Mr. Sutton.

The Chairman read the following letter, which he had received from Mr. Skaife, referring to the remarks which had been made at the last Meeting of the Society regarding Mr. Skaife's Pistolgrams exhibited to the Meeting.

Vanbrugh House, Blackheath, April 7th, 1860.

Dear Sir,—Permit me through you to correct an erroneous impression likely to result from a report of the proceedings of your Society which I perceive published in the 'British Journal of Photography' on the 2nd inst., stating that I have taken out a patent for my process of indurating pistolgrams by heat,—such not being the fact. The mistake has probably arisen from confounding the Pistolgraph, which is patented, with the Pistolgram, the production of the pistolgraph.

Also I wish it to be understood that, though I succeed in fixing by means of heat a collodion picture between two plates of crystal or glass of dissimilar colour, sufficiently hard to admit of the compound being cut or ground on a lapidary's stone to any shape the jeweller may require, without injury to the enclosed picture, yet experience proves that, if the indurating or baking of the picture is carried but a small trifle beyond the hardness required to shape "the gem," the brilliancy of the picture is sacrificed, by the collodion film becoming charred. Once the film is charred to blackness, all adhesion between the two plates has ceased. But on raising the temperature of the two plates until they have attained a bright red heat, they again unite, but this time by their inner surfaces melting together, when injury, more or less, to the contained picture, as regards sharpness of outline, is sure to be the result.

This was the case with the over-baked pistolgram on which at the last meeting of your Society you allowed Mr. Tunny to experiment with his knife. But, whether the result of that experiment was at first misunderstood or incorrectly reported, your letter to the Editor of the 'Caledonian Mercury' on the 27th ultimo interpreted my views on the matter entirely.

I would not, however, have it understood that a properly baked pistolgram is chemically as well as optically and mechanically united, as was the case with the over-baked specimen in question. Boiling the former in water for a short time would admit of the two glasses being easily separated, as would exposing the cemented compound to a heat above that em-

ployed in the fixing. Briefly, the best adhesion, with safety to the enclosed picture, is only obtained between the two extremes, under- and over-baking.

In conclusion, permit me, dear Sir, to thank you for the kindly interest you have taken in the experimental works of one personally unknown to you. THOMAS SKAIFE.

To Sir David Brewster, President of the Photographic Society of Scotland.

Mr. TUNNY said:—

MR. CHAIRMAN,—It will be in the recollection of those gentlemen who were present at our last Meeting, that the observations I made with regard to Mr. Skaife's pistolgrams had no reference whatever to the merit of his invention. When you, Sir, presented Mr. Skaife's specimens to the Members, you said, as I understood, that his pictures were preserved from damp and other atmospheric influences by enamel. Upon examination of these specimens, I stated, in the absence of anything like definite information as to the mode by which these pictures were protected, that their appearance did not indicate that they were protected by enamel, or homogeneously combined, but that the two plates of glass seemed to be cemented together by a cement holding together the edges of the glass from which the collodion film had been removed. This I at once proved by separating the two plates. Mr. Skaife seems to have been rather angry at the liberty I took with his pistolgrams, for he has written, as you are aware, to one of our Edinburgh newspapers (not, I am sorry to say, in the very best of spirit), denying the correctness of my surmise. My observations having been made at our last Meeting, I have waited till this Meeting to answer that letter; I shall do so by placing one of Mr. Skaife's pistolgrams, which has been forwarded from England, into this bottle containing benzole for a few minutes, when I expect you will see the plates separate without having to resort to my penknife.

Before the conclusion of the Meeting, Mr. Tunny removed the pistolgram from the benzole, when the two plates of glass were found to be completely separated, as he had predicted would be the case.

A communication was read, entitled

Notice respecting the Invention of the Stereoscope in the sixteenth century, and of Binocular Drawings, by Jacopo Chimenti da Empoli, a Florentine Artist. By Sir DAVID BREWSTER, K.H., F.R.S.

HAVING had occasion to inquire into the history of the stereoscope, I found, contrary to the general opinion, that its fundamental principle was well known even to Euclid; that it was distinctly described by Galen 1500 years ago, and that Baptista Porta had, in 1593, given such a complete drawing of the two separate pictures as seen by each eye, and of the combined picture placed between them, that we recognize in it not only the principle, but the construction of the stereoscope.

Still, however, we had no proof that any person had drawn a *right-* and *left-*eye picture of any object and united them either by the eye or by an instrument; and it was hardly to be expected that any such discovery should be made.

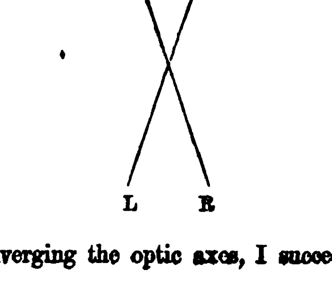
Last summer, however, when Mr. Alexander Crum Brown and his brother Dr. John Brown were visiting the Musée Wicar at Lille, Mr. Brown observed two drawings placed side by side, and so perfectly similar that he could account for the fact only by supposing that they were binocular pictures intended to be combined into relief either by the eye or by an instrument.

The following is the account of these pictures which he communicated to Principal Forbes, who brought it under my notice:—

"In the Musée Wicar at Lille there are two drawings, with a pen and in water colours (viz. No. 215, 216), of a young man sitting upon a bank and drawing with a pair of compasses. These two drawings are by Jacopo Chimenti da Empoli, a painter of the Florentine school, who was born at Empoli, near Florence, in 1554, and died in 1640.

"They are drawings of the same object, from points of view slightly different. That on the right hand is from a point of view slightly to the left of that on the left hand.

"They are so exactly on the same scale, that,



by converging the optic axes, I succeeded in

uniting the two so as to produce an image in relief. They united so easily and completely that I could not help thinking that they had been drawn for the purpose of being looked at in that way. The figure has one arm extended towards the spectator, and with the other has drawn a line upon the floor almost at right angles with the plane of the picture. The arm and the line stand out most remarkably in relief when the two pictures are united. As far as I could judge, the difference between the two pictures was greater than would be produced by a change of the position of a spectator equal to the distance between the two eyes, so that the stereoscopic effect was somewhat exaggerated.

"It was best seen at the distance of four or five yards. The height of each picture is given in the catalogue as 0·297, and the breadth as 0·216, in parts of a metre (12 inches and 8½ inches). I think, if we had a photograph of the pictures, it would be much easier to prove the stereoscopic character than merely by referring to them; and if the photographs were of such a size that they could be transposed and put into the stereoscope, any one could see it."

This account of the two drawings is so distinct and evinces such a knowledge of the subject, that we cannot for a moment doubt that they are binocular drawings intended by the artist to be united into relief either by the eye or by an instrument.

This conclusion is the more probable as the drawings must have been executed before 1640, the year in which Chimenti died at the age of eighty-six; and it is highly probable that they were executed soon after 1593, when Baptista Porta had published the Theory of the Stereoscope, and when Chimenti was in his fortieth year.

The curious discovery of these pictures, thus made by Mr. Brown, seemed to me so interesting and important, that I wrote to M. Delezenne, a Corresponding Member of the Institute of France, residing near Lille, and requested him to obtain for me photographs of the pictures.

In his reply to this letter, M. Delezenne informed me that the Director of the Musée Wicar, in consequence of certain abuses having taken place, had resolved not to allow any copies to be taken of the pictures and drawings. An exception, however, was made in favour of Prince Albert, who had employed Mr. Bingham to take photographs of the most important of them. I have no doubt that, through the kindness of His Royal Highness, photographic copies of the binocular pictures of Chimenti will be obtained for publication.

A paper was then read—

On the Preparation of Paper for the Waxed-paper Process; with some remarks on the Effects produced on Sensitized Positive Paper by contact with papers which have been exposed to light. By The Rev. T. M. Raven.

If an apology is necessary for troubling you this evening with what may be considered an uninteresting paper, it may be alleged perhaps that, in a small Society such as ours, each member of it is fond to do what he can for it when called on to do so, as I have been. In my case, living so far from Edinburgh, I am induced to hope that this communication will be received as a reminder that I am still one of you, and do not forget my old friends, and that I do not intend you should forget me.

I regret that the Report of the Lens Committee was not more carefully considered before publication.

I have for some time been testing lenses so as to decide what lens to use myself. I have an orthographic by the late Mr. Ross, which was *corrected* by him some time before his death. This lens gives better results than several others of the same form I have tried by the same maker; while none of the orthoscopic are equal to what I consider an inferior orthographic.

I should strongly recommend any amateur about to take to photography to procure from Mr. Ross or Mr. Goddard the old Meniscus lens in preference to any other.

For a few days last summer I tried wet collodion; I used one of Smart's tents, purchased from Messrs. Murray and Heath. No tent, I think, can be better adapted for out-of-door work than this most excellent one. It is easily put up, and as soon and as easily taken down; in fact, it is so thoroughly complete with every convenience that no improvement can, I think, be made upon it.

My collodion pictures in our Exhibition which has just closed must have shown you that they are the productions of a beginner only, in this process. I hope to be able to send you something more worthy of the Exhibition another year, and to show you that I can work wet collodion with success.

Every day's experience convinces me that a great deal more may be done with the "waxed-paper process" than is generally supposed, and that for ordinary out-of-door subjects it has advantages which no other process possesses. Many operators by this process err in using too much acetic acid in making whey. Their iodizing solution contains so much acid as to render a lengthened exposure in the camera quite necessary, while papers thus iodized can never give really good results. By far the

best way of making whey is with rennet fresh from the butcher's. When the curds are settled, filter the liquid; after which, add 35 grains of iodide of cadmium to 36 ounces of the whey; *refilter*, and then add the following ingredients:—

Iodide of potassium	470 grains.
Bromide of potassium	90 grains.
Cyanide of potassium	10 grains.
Tincture of iodine	35 minims.

I am inclined to think that the use of tincture of iodine (*except with extreme caution*) is liable to give much of the granular appearance to a waxed-paper negative which is so fruitful a source of annoyance in this process.

I think it is not advisable to put more than ten or twelve pieces of paper together in the same iodizing bath. I leave them in a sufficient quantity of the above solution twelve hours, turning them over occasionally, and separating the papers, so that they are all thoroughly and effectually iodized. This paper I excite in the usual way, always taking care that the silver bath is kept up to the same strength and is filtered through kaoline as often as it is used after the first time.

The quality of the negative depends much on the purity of the chemicals used, and, above all, on the kind of dishes in which the paper is prepared. Gutta-percha is as unsuited for the iodizing and developing solutions as it is universally allowed to be for the silver bath. Porcelain is little better. I do not find that papier-maché trays last long. I have given up the use of gutta-percha trays even for the hypo-bath in the paper process, as I find that it does not answer. I have repeatedly seen a fine negative injured by fixing in gutta-percha trays. In sheet gutta-percha you will doubtless have observed small red spots. I have a tray made of this material which I used for some time for the hypo, but was obliged to throw it aside, as I found the red marks transferred to the paper.

I do not like the wood-and-glass trays. Wood and glass do not pull well together, but seem inclined on all occasions to dissolve partnership. The sharp corners cannot easily be cleaned without cyanide; and that dissolves the marine glue. I have some well-made glass dishes, and these I use for all the different processes through which the paper has to pass.

It is necessary in working this process to be most particular in selecting blotting-paper perfectly free from iron and other impurities. Mr. Sandford, of 18 Red Lion Square, Holborn, supplies me with an excellent kind of blotting-paper. It is difficult to lay down any law as to the proper time of exposure in the camera either of a piece of sensitive paper or a collodion plate. Experience alone will teach the proper time: as one subject on which a camera may be brought to bear differs from another, so will it be found that the necessary exposure to get a good picture will vary. I took last spring some pictures of Melrose to which I gave an exposure of seven minutes; while a few weeks later I gave twenty minutes to some pictures I took of Holyrood. The light on both occasions was good, but the different colour of the two subjects, and the darker one being more in the immediate vicinity of smoke, &c., made the difference in the time I found it necessary to expose the papers. I have been much struck with the remarkable difference of the proper time of exposure in the camera in different places. I have travelled with my camera from the far north of Scotland on to the borders of Spain; and the further south I have gone, the longer has been the exposure I have given my picture in the camera. I have found the same thing in printing pictures in this country and in France.

The "waxed-paper process" is so well known to and practised by so many members of this Society with great success, that it is quite unnecessary to say more about it. The 'Photographic Journal,' the back Numbers of which are in the hands of most photographers, is open to all those who want full and complete information on this as on all other photographic questions. The process, as worked by myself, will be found in the last year's volume of that journal; and I am about to publish a small manual of photography which will contain information useful, I trust, to beginners.

I wished to have brought before this Society, had I been in Edinburgh, a few prints on to the backs of which is transferred the impress of the negative that I had been printing from before. I had several frames at work, and as soon as one print was sufficiently exposed I changed the negative for another. Each frame had a piece of cardboard placed between the back of the pressure-frame and the back of the sensitive-paper. I gave some of these prints to our late lamented friend Professor George Wilson; and I see, from the 'Liverpool Photographic Journal' (which Mr. Shadbolt kindly sent me), "that he brought this under notice at the Meeting in Aberdeen, but that the report of the fact was too vague and incomprehensible for that journal to mention." This statement was contained in a critique on a letter of mine on this subject which appeared in the 'Photographic Journal.' I had stated in that letter "that the sensitive-papers and cardboards were perfectly dry;" to which Mr. Shadbolt says, "Without for a moment questioning the good faith of the statement relative to the perfect

dryness of the papers, we certainly doubt the correctness of the assertion in a strict sense, and for this reason, that it is not probable that any one would voluntarily employ paper perfectly dry for printing upon photographically, unless he had some special object in so doing." He adds, that "the paper and cardboard might be what is conventionally termed dry." I think this is a case of splitting straws. Any one who knows how easily a waxed-paper negative is spoiled in printing, has "some special object" in using none other than what he considers perfectly dry printing-paper. I am quite as well aware of the hygroscopic properties of paper as Mr. Shadbolt can be; but when I speak of paper and cardboard as being perfectly dry, I mean exactly what Mr. Shadbolt would mean by ordering his bed to be well aired or his linen to be well dried.

I find that the sensitiveness of papers, whether prepared with chlorides or iodides, can only in a small measure be destroyed by submitting them a second time to the substance with which they were prepared previous to their excitation; and secondly, that a sensitive piece of waxed iodized paper exposed to light, and then taken into a dark room and placed in contact with *unexposed* excited paper of the same kind, will turn it brown in the course of a few minutes. I have occasionally, when printing, kept a portfolio of freshly excited paper in my operating-room, into which I have taken my printing-frames for the purpose of changing the paper when the positive is sufficiently printed. In this portfolio I have placed the prints with the rest of the paper I was about to use; and these sensitive unexposed papers I have seen in the course of the day turned in colour in such a manner as to show that it is by contact with the exposed papers that they have done so. This very week I have met with much the same sort of thing. After exciting and drying my paper in the evening, I have put it into a printing-frame which has been in use during the day. The frame contains a pad of blotting-paper, and when I have opened the frame next morning I have found the papers turned slightly brown. I doubled one piece the other evening so as to bring a *portion only* of the sensitive surfaces together, and placed it on this blotting-paper, which had been in bright sunshine all day; in the morning I found that the sensitive portion of the paper which had come in contact with the blotting-paper was slightly turned in colour, while the doubled portion of the paper was not affected. I trust that practical photographers will make some remarks on these facts. If we would only observe anything unusual or accidental which occurs in our manipulation, I think we should find it invaluable to ourselves and to our favourite art. There is no science or art so much indebted to accident for its discoveries and improvements as photography. If every gentleman in whose experience a fact transpired for which he could not account would make a note of the same, there is no doubt that they would form a most curious and interesting collection, and lead, by discussion, to very valuable experiments and results.

Mr. Findlay Anderson read a paper

On Photographic Landscapes.

After some preliminary observations, Mr. Anderson said,—In what does the power of imagination consist, but in culling beauties from every source and quarter, and grouping them together so as to harmonize and produce a perfect picture? The artist studies separately different objects and forms, to be introduced into his pictures as occasion requires. If he is painting a fancy piece, he freely makes use of these sketches to compose it; his highly cultivated mind, memory, and taste grouping and arranging them, and filling up the vacant portions of his canvas, so as to make his picture beautiful in all its parts. But even if the subject of his pencil be a sketch from nature, he is not rigidly tied down to copy it in all its details. The poets have always enjoyed the licence even in their historical poems of drawing from the treasures of fiction ornaments to embellish their facts. And so the artist exercises the privilege of omitting or changing anything in the scene he is painting that injuriously affects the beauty or harmony of its parts, and of introducing other objects that may supply deficiencies and fill up his picture. In the foreground he introduces at will figures or animals. A tree or a building may occupy the centre, and a distant landscape or hills form the background.

But Nature allows the unhappy photographer no such privilege. She says, "I will cause the rays of my sun to impress on your paper or glass any object you may select; but you must take me as I am—for better or for worse. I will not allow you to exercise your judgment and imagination in choosing what you may consider picturesque, and rejecting what you may be pleased to dislike. You must take me in whole, or not at all." These are hard terms, Dame Nature, for an artistic mind; but inflexible is she whose likeness we are to take, and we must therefore be content to submit to them. In order that we may suffer as little as possible from these hard terms, we must learn,

in selecting a landscape for our picture, not to be too hasty in our choice, but to examine carefully the scene Nature presents to us, in order that we may take up a position from which a view including the greatest amount of beauty, and excluding as much as possible all deformities, may be obtained. How often have we failed in this caution, and found, after our camera had begun to do its work, that, had we placed it at some distance either to the right or to the left, we should have had a much more picturesque view!

But there is another fault connected with the position of the camera which I especially wish to impress upon your attention this evening, as it produces a defect that in my opinion deforms many (perhaps I may say the greater part) of our photographic landscapes; and that is, the undue elevation of the horizon.

I know not what the exact rule of drawing is, but I find that in the landscapes of Claud and other masters the true horizon—that is to say, when it is represented by water or level country—is almost invariably placed considerably below the middle of the picture. If this be the case in pictures where the artists have the power of introducing objects to make a picturesque foreground, how much more should it be in photographs, where we have no such opportunity!

How often do we see in the foreground of photographic landscapes a broad black space supposed to represent grass—or an unmeaning mass of foliage, or a sheet of water without a boat or a shadow, or a wide expanse of road or avenue without an animal or vehicle; and in these same pictures we find the subject running high up and leaving scarcely any, or at least far too little, sky.

I have seen a photograph of lake-scenery in which there were hills in the distance, a promontory with buildings on it jutting out lower down, and some picturesque rushes and reeds still more in front.

Here was everything required to make a pretty picture—objects in the fore-, middle- and back-ground,—but the beauty of the whole was marred by a quantity of shadowless water being introduced between the bottom of the picture and the rushes, and the depth of the sky being proportionately reduced.

It sometimes happens that we are perfectly pleased with a portrait or likeness in our possession until some kind (?) friend, whose unhappy bent of mind it is to analyse and find out every possible flaw or defect, has pointed out that the mouth has got a twist, or the nose a crook, or that the hand is unduly large, or some such fault. Ever after, the eye appears by some fatality to rest on the defect, and we never again enjoy the unalloyed pleasure we once did in looking at the picture.

Now, something of the same kind happens to me on looking at many photographic landscapes. My eye becomes intuitively fixed on the uninteresting and unmeaning breadth of foreground—on the horizon stretching up nearly to the top of the picture, and the absence of any depth of sky; and so, the gratification I should otherwise have derived from what may be really beautiful in the picture is greatly diminished. Had this evil not admitted of a remedy, I should not this evening have suggested a defect which, now that it has been brought to your notice, may in like manner diminish your pleasure at a Photographic Exhibition, and lead you to say inwardly, as I often do, "Oh that I could cut off a few inches of that foreground, and add them to the sky!"

But I trust the observations I have made may lead any landscape photographer whose attention has not hitherto been directed to this particular point—in adjusting his camera to receive the image of the landscape in the focusing glass—to try *how much* he can reduce the breadth of the foreground, and add to the depth of the sky, without injury to his subject.

If a more artistic effect may hereafter be given in consequence to any landscape, I shall not regret having come forward this evening, and as a Member of this Society attempted to contribute something which might help to make one of these our monthly meetings useful and agreeable.

The Meeting then adjourned.

EXTRA MEETING, 8th May, 1860.

Sir DAVID BREWSTER, President, in the Chair.

The Minutes of the preceding Meeting were read and approved.

Mr. Thomas Elder and Mr. R. Murray were elected Ordinary Members.

The Honorary Secretary read a Paper "On Photography in its Relation to the Fine Arts," by A. Claudet, Esq., F.R.S. (which will appear in our next Number.

Mr. J. C. Burnett read a Paper entitled "Brief Researches on the Burning-in of Photographs on Porcelain, &c." (which will appear in our next Number).

The President brought before the Meeting a communication which he had received, "On a Method of Drawing a Stereoscopic Duplicate of a Single Picture," by Mr. Walter Hardie, Printer, Edinburgh. (This Paper will appear in our next Number.)

ANNUAL GENERAL MEETING.

The Meeting was then resolved into the Annual General Meeting, and the Honorary Secretary read the following Report by the Council:—

The fourth year of the Photographic Society of Scotland being now completed, it is once more the duty of the Council to submit to the Members their Report on the affairs of the Society during the past year.

It is with much satisfaction that the Council are enabled to report that during this period the success which has hitherto attended the Society in all its departments has been fully maintained. An addition of upwards of twenty-three Members has been made to the roll of the Society,—an addition which includes not only many enthusiastic and successful amateurs, but also some of the chief professional photographers in the kingdom. Nor is the list of Members of the Society now confined to residents in this country; in India, as well as in different parts of Europe, the Society has Members, who doubtless will be valuable contributors to the Exhibitions and to the Meetings of the Society.

Whilst pointing with satisfaction to the additions made during the year to the list of Members, the Council have, on the other hand, the painful duty of referring to the great loss which the Society has sustained by the death of one of its most distinguished Members, Professor George Wilson. Taking a lively interest in everything connected with the art, although not himself a practical photographer, Professor Wilson was ever ready to give to the Society the information which he possessed. The communications which from time to time he made to the Society were of the most valuable and suggestive kind; and there can be no doubt that, had he been spared to prosecute his researches, he would have done much to advance a knowledge of the chemistry of Photography.

The Fourth Exhibition of the Society was again held in the Exhibition Rooms of last year, No. 90 George Street. Although, from various causes, several Members were prevented from contributing as they had done on previous occasions, a larger collection of works was sent in than had ever before been received, several of the chief photographers in England contributing for the first time. For evidence of the excellence of the Exhibition itself, the Council have only to refer to the various critiques which appeared in the newspapers and photographic journals. These, almost without exception, pronounced the Exhibition to be greatly in advance of any previous Exhibition, either here or elsewhere. And the Council may also refer, in regard to this, to the Report of Mr. Horatio Ross, to whom they confided the duty of deciding the competition for the Society's medals and the Maconochie Wellwood prize, in which he states that, from the great and nearly uniform excellence of a large proportion of the pictures in the Exhibition, it was with the utmost difficulty that he could make an award.

Excellent as the Exhibition was, however, the profits arising from it, after clearing all expenses, although very considerable, have not been so great as those from the Exhibition of last year. This, the Council conceive, is to be accounted for by the remarkable severity of the weather during the greater part of the period that the Exhibition was open; and they therefore have no doubt that, should the Exhibition of next year be held under favourable circumstances, its pecuniary results will be at least as successful as those of last year.

The Society's medals were this year awarded to Mr. H. P. Robinson and Mr. James Mudd, and the Maconochie Wellwood Prize to Mr. Thomas Rodger, a member of this Society. It is believed that this award of the prizes has given general satisfaction; and the Council feel that the thanks of the Society are due to Mr. Horatio Ross for the very great care and trouble which he took in fulfilling the duties of Judge in the Competition. The Society has also to acknowledge the services of Mr. Walker, Mr. T. B. Johnston, and Mr. Tytler, who, with Mr. Scott Elliot, discharged the onerous duties of the Exhibition Committee.

During the past year, several interesting and valuable papers have been read at the monthly meetings; and several new processes, and improvements on the processes already in use, have been brought before the Society. Among the most remarkable of these is the Dry Collodion Process invented by Mr. Macnair, and which promises not only to supersede entirely all other dry processes, but, to a great extent, to take the place of wet collodion itself.

It was determined last year that prizes should be offered for the most valuable and important communications on the chemical, optical, or mechanical departments of the art, made to the Society during the season. The Council would accordingly now recommend that the Society should confer on Mr. Macnair a bronze medal, for the account of his dry-collodion process.

By the arrangement entered into with the Photographic Society in London, members of this Society have been supplied gratis during the past year with the 'Photographic Journal.' The Council would propose that this arrangement should be continued, with this modifica-

tion, that as some Members do not care to have the 'Journal,' and others have it supplied through other sources, such Members should, at the end of the year, each be supplied, in lieu thereof, with one or more photographs purchased in the Exhibition of the Society, not exceeding the cost of a copy of the 'Journal' for the year. Should this arrangement be approved of, Members desirous of availing themselves of it for the current year will require to give immediate intimation to that effect to the Honorary Secretary.

The laws of the Society require the retirement at the present time of the President, the Senior Vice-President, the four Senior Members of Council, the Honorary Treasurer, and the Honorary Secretary; but these gentlemen are eligible for re-election. The Honorary Secretary, however, has intimated his wish to retire. The Society has also to appoint an Honorary Auditor for the ensuing year.

In reluctantly accepting the resignation of Mr. Kinnear, who has so well discharged the duties of Honorary Secretary since the Society was established four years ago, the Council are happy to be able to say that they have succeeded in inducing Mr. A. F. Adam to become his successor, on condition of his being relieved of certain of the duties formerly attached to the office; and they have no doubt that that gentleman, who is one of the original members of the Society, and who has ever taken a lively interest in its prosperity, will fill the office in the most satisfactory manner.

An abstract of the Honorary Treasurer's accounts is annexed hereto, showing a total balance in favour of the Society at the present time of £315 12*s.* 8*d.*, as compared with £229 9*s.* 9*d.* at the close of last year.

State of Funds as at 5th April, 1860.

Balance in favour of the Society on the General Account as at 5th April, 1860 ..	£284	19	8
Arrears of Subscriptions due by Members (considered recoverable)	6	6	0
In connexion with the Exhibition:			
Balance in favour of the Society as at 5th April, 1860	24	7	0
Amount of Funds as at 5th April, 1860	£315	12	8

Edinburgh, 4*th May*, 1860.—I have examined the accounts of which the above is an abstract, with the relative vouchers, and I find the same correctly stated and duly vouched.

JOHN CAY, *Honorary Auditor.*

On the motion of Dr. Paterson, seconded by J. F. Dundas, Esq., the Report was unanimously adopted.

On the motion of Sheriff Hallard, seconded by Findlay Anderson, Esq., the following gentlemen were elected office-bearers for the ensuing year:—

President:—Sir David Brewster.

Vice-Presidents:—Horatio Ross; George Moir.

Council:—Alex. Young Herries; Geo. Harvey; T. M. Raven; T. B. Johnston; W. Scott Elliot; Wm. Walker; C. G. H. Kinnear; John Moffat.

Honorary Treasurer:—H. G. Watson.

Honorary Secretary:—A. F. Adam.

Honorary Auditor:—John Cay.

Thereafter the President presented the Society's Bronze Medal to Mr. Macnair, and also moved that the thanks of the Society be given to Mr. Kinnear for his past services as Honorary Secretary, which was carried unanimously, and the Meeting then adjourned.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

The Annual General Meeting of this Society was held at the Golf Club House, Blackheath Hill, on Monday, April the 16th, the President, J. Glaisher, F.R.S., in the Chair.

The minutes of the last meeting were read and confirmed.

Messrs. C. Busk and H. Williams were appointed to audit the accounts, which were left in their hands for that purpose.

The Treasurer, Mr. J. B. Spencer, having resigned his office, it was moved, seconded, and carried unanimously, that the Secretaries, Mr. T. R. Wheeler and Mr. Travers B. Wire, be requested, jointly, to act as Treasurers; and the bye-law was modified which has reference to that office.

A vote of thanks was tendered to the Secretaries for their labours during the past year.

The Report of the Council was then read and approved. It was moved, seconded, and carried, "That the Report just read be received, adopted, printed, and circulated."

A balloting-list of officers was then submitted to members, the President, Mr. Glaisher, retiring from office, pursuant to the laws regulating the Society. It was moved by Mr. J. Harding, seconded by Mr. H. Williams, and carried *nem. con.*, "That the best thanks of this Society be tendered to J. Glaisher, Esq., for his able, impartial, and conciliatory conduct while in occupation of the chair of this Society."

Mr. Glaisher responded in suitable terms, and then vacated the chair, indicating Mr. Heisch, F.C.S., as the gentleman upon whom the choice of the Society fell as his successor.

Mr. Heisch, on taking the vacant chair, briefly addressed the meeting, stating that he had great pleasure, as his first act of office, in calling upon Mr. Hardwich, who had most kindly come down, to read a paper before the Society.

Mr. Hardwich then proceeded to read the following paper:—

On the Present State of our Knowledge regarding Photographic Collodion.

Although not a member of your Society, I have asked and obtained permission to read a paper this evening upon collodion, being fully convinced that the interests of the art require a better understanding of the modes used for preparing that substance, and also a more perfect agreement between the various formulæ. At present it is almost impossible to compare the experimental results of photographers, or to deduce any general principles from them, seeing that scarcely two can be found who agree in their mode of working. I propose, therefore, to lay before you for discussion an outline of what has been certainly ascertained as regards the manufacture of photographic collodion.

For a long time subsequent to the discovery of the collodion process by Archer the whole chemistry of the subject was imperfectly understood; and even on the main question of the constitution of pyroxyline, opinions were divided. In 1854 Mr. Hadow published his researches, establishing beyond the possibility of a doubt the true nature of pyroxyline as a substitution compound, and proving the existence of at least four varieties of that substance, ranging from xyloidine up to gun-cotton,—the lower compounds containing less, and the higher compounds more, of the peroxide of nitrogen. Besides these varieties, it was shown that the properties of photographic pyroxyline are much affected by the temperature at which it is prepared, and that the same acid gives a different result accordingly as it is used hot or cold.

Subsequent to this, Dr. Norris, of Birmingham, sent two communications—the one to the 'Journal of the Photographic Society,' and the other to another photographic journal — in which he called attention to a point not before noticed, viz. the superior value in collodion of the substitution compound nearest to xyloidine, compared with that containing more peroxide of nitrogen, and approaching to gun-cotton in composition. This point may not, perhaps, at first appear of great importance; but in reality it is so, and any maker of collodion who chose to neglect it would fail in producing a first-rate article.

Whilst these investigations were being carried on, many of the manufacturers of negative photographic collodion prepared pyroxyline from paper or linen, finding by experience that it was difficult, when using cotton wool, to secure that limpid character of collodion and intensity of image which the operator requires. The reasons why paper (described by chemical authorities as identical with cotton in its composition) should yet act differently in this process need not engage much of our attention; it will be sufficient to state that the difference is probably due, in part, to the weakening which ensues when the nitric acid touches the outer portion of the fibre, and in part to the fact of paper being often made from cellulose in a semidecomposed state, or from *linen*, which has been proved to yield a pyroxyline of different properties from that furnished by cotton.

My own experience, as a maker of collodion for three years, enables me to speak with confidence against the employment of any materials which give intensity to collodion in virtue of some principle of decomposition; for, to say nothing of the difficulty of obtaining these substances in a uniform state, it is certain that the stability of the collodion is lessened by their employment: just as nitroglucose, a product of the action of nitrosulphuric acid on sugar, is more unstable than pyroxyline, so is pyroxyline made out of old calico or linen more unstable than pyroxyline prepared, in the same acids, from cotton wool. Pictures of first-rate excellence have been taken with collodion from linen, but I cannot now recommend such collodion; for, on attempting to export it to distant climates, or subject it to great heat in our own country, it is apt to undergo a spontaneous decomposition, even when kept in the plain state in a dark place, and without any addition of iodizer. A knowledge of this uncertainty in some kinds of collodion is highly useful, because it prevents the maker from placing dependence on a formula which would eventually disappoint him. It is probable that photographers, trying such a formula, will be

pleased with it; but let them send the plain collodion for a voyage round the world, and try to work with it again on its return, when they will probably find it in a gelatinous state, or in a state of semiliquefaction, and so highly ozonized as to be useless for any purpose.

We are therefore bound to discard all unstable materials, and to return once more to the cotton wool, which must, by some means or other, be *coerced* into the proper state. That this could be done was, I believe, known many years ago to individuals; but if so, it was not published. I have stated, on a previous occasion, that the process for making intense negative collodion from cotton wool was suggested to me, in the first instance, by the experiment of soaking paper in diluted sulphuric acid, and subsequently converting it into pyroxyline. The nature of the change produced by the sulphuric acid on the cellulose is not known; but it has the effect of increasing the intensity of collodion made from the resulting pyroxyline, and of imparting those qualities of negative which I have spoken of in connection with decomposed materials, like old cambric. Fortunately, the pyroxyline from the fibre parchmentized by oil of vitriol is more stable than that from linen, and has been proved to stand as well in collodion as most other kinds of pyroxyline which the photographer is accustomed to employ.

But, in addition to an action of the sulphuric acid in this process, I have lately succeeded in proving that a hot and weak nitric acid may also exert a very peculiar effect, and one which is almost exactly the reverse of that produced by the oil of vitriol. To show this action of weak nitric acid, three volumes of pure nitric acid of 1·45 may be mixed with a volume of oil of vitriol*, heated to 150°, and pyroxyline from the formula which I shall presently describe as No. 1, immersed in it for a few seconds. This treatment causes very little change in the appearance of the pyroxyline; but when made into collodion, it is found to have lost its characteristic toughness, and to have become weak and rotten. Further than this, the negatives are no longer sharp and intense, but feeble and metallic in appearance†.

* In attempting to produce this change by means of nitric acid alone, it will be found difficult to prevent the cotton from being dissolved. Pyroxyline is easily soluble in dilute nitric acid; but the addition of a little diluted sulphuric acid throws it down again; so that sulphuric acid in small quantity lessens the solvent action, independently of abstracting water.

† In addition to this modified pyroxyline produced by hot nitric acid mixed with a little sulphuric acid, I find that a remarkable change of properties may be produced by the pure nitric acid of 1·45 employed cold, and without any admixture of sulphuric acid. The pyroxyline gradually becomes opaque, and loses its solubility in ether and alcohol; eventually it dissolves in the cold nitric acid without any evolution of gas; and if water be then added, opaque white flakes are thrown down, which, when treated with ether and alcohol, simply swell up without passing into solution.

The above facts are of more importance, as regards the manufacture of photographic collodion, than would at first be supposed: for it can be proved that those actions which have just been attributed to sulphuric acid and weak nitric acid respectively, may be secured at will by modifying the composition of the nitrosulphuric acid. If a strongly-parchmentized product suitable for making intense collodion be desired, the bulk of diluted oil of vitriol in the mixture must be considerably greater than that of the diluted nitric acid; whilst if it be required to prepare a porous collodion to remain a longer time without becoming surface-dry, and to yield an image with less violent contrast of light and shade, then the proportion of weak nitric acid may be increased. Observe, also, that these differences are not due to variations in the temperature, or in the degree of concentration of the nitrosulphuric acid, both of which are supposed to be the same.

The following Table exhibits the composition of five different mixtures of sulphuric and nitric acid, in which an attempt has been made to graduate the proportion of water, so that the per-centage of peroxide of nitrogen imparted to immersed cotton fibre may be nearly the same in each. The Table may not, perhaps, be absolutely correct, since it is very difficult to judge precisely of the strength of nitrosulphuric acid, on account of its solvent action on cotton varying not only with the temperature and quantity of water, but also with the quantity of diluted oil of vitriol present. The safest plan, therefore, appeared to be to neglect all theoretical calculations, and to construct the Table by simple experiment, taking care in each case to work with the maximum quantity of water, and stopping the addition of water only when it was found that the product left a thick sediment on being dissolved in ether and alcohol. This plan will probably be found to answer for the three upper members of the series; and the two lower members are not of much practical importance.

Composition, by Volume, of Nitrosulphuric Acid for preparing Photographic Pyroxyline.

	Oil of Vitriol, 1·845 at 60° F.	Pure Nitric Acid, 1·45 at 60° F.	Water.
No. 1	3	1	$\frac{1}{2}$
No. 2	2	1	$\frac{3}{8}$
No. 3	1	1	$\frac{5}{16}$
No. 4	1	2	$\frac{5}{32}$
No. 5	1	3	0

The pyroxyline yielded by each of these five mixtures is soluble in glacial acetic acid, and

also in boiling absolute alcohol, whilst in neither case does the resulting collodion produce an entirely opaque film. The substitution body formed is therefore a little above compound D or xyloidine, but not above compound C. A more careful examination, by immersing dry cotton at low temperatures, seems to indicate that, if there be a difference, No. 1 is somewhat stronger than No. 5. The collodion, however, from No. 1 is more fluid than that from No. 5, thus showing that other causes, besides temperature and dilution of the mixture with water, have to do with flowing properties. A greater amount of fluidity than exists even in the collodion from No. 1 may be produced by dipping the pyroxyline first in No. 1, to secure the full action of the sulphuric acid, and afterwards in No. 5; the weak nitric acid will then act more decidedly than it would have done after a single immersion.

The temperature employed for the above table of acids may be 150° F.; and in making the pyroxyline, we find that the lower numbers give a product which has an opaque appearance, whereas the pyroxyline made by No. 1 and 2 exhibits no opacity. The five samples of collodion differ very much in the rapidity with which they set upon the glass, and also in their physical structure,—the first setting rapidly, and producing a horny film; the last scarcely possessing any power of setting. The only way of overcoming this, and putting them on something like a par, is by varying the proportions of ether and alcohol in the solvents, using more alcohol in the former, and more ether in the latter. These collodions also differ very materially as regards the intensity of the negative image, which increases as you ascend the scale.

These disjointed remarks have been thrown together not with a view of exhausting the subject, but simply to assist in reconciling some of the extraordinary discrepancies in writings on collodion: for whilst one author advises that at least three parts of alcohol be employed to one part of ether, another (a French author) says that the art of making good collodion is in reducing the alcohol to the lowest possible limits, and employing scarcely anything but ether. Others, again, have written as if all depended upon the iodizing solution, and have distinguished between the quality of negative produced by iodide of potassium and iodide of ammonium, or between iodide of potassium simply, and the same compound containing iodide of silver dissolved. Not that I mean to affirm that the nature of the base is of no importance at all, because there are secondary reactions between the base and the pyroxyline, but simply that the particular iodide employed is of minor consequence as compared with the mode of making the pyroxyline.

The reasons which induce me to fix upon the formula for nitrosulphuric acid marked No. 1 in the Table, were principally as follow: I was assured by those who professed to be acquainted with the wants of the public, that a collodion was needed which would produce a dense negative in a rather dull light; for that the practitioners of the art in this country had to perform their work, as a rule, under great disadvantages in that respect, and it was comparatively easy to reduce the intensity when in excess, but more difficult to increase it when deficient. The highly-parchmentized pyroxyline appears to me to have an organic reaction towards the salts of silver somewhat greater than that of the other varieties, and I attribute the tendency to redness in the negatives to that cause. It has not been proved to be so; but the idea may be entertained, seeing that the action of diluted sulphuric acid is known to change cellulose into dextrine, and both dextrine and gum impart a red colour to a collodion negative when applied to the surface of the partially-washed film.

If we allow that great intensity of negative ought always to be at our command, yet there are other modes of obtaining it without purposely modifying the pyroxyline; and therefore the question becomes, which is the best? Glycyrrhizine was carefully tried, both in bath and collodion, but was condemned as delusive in the long run, although promising well in the beginning. Neither could confidence be placed in ether containing organic impurities, although I have heard it said that the cheaper and more highly-methylated qualities of ether, as they were made some years back, gave better and more intense negatives than pure ether. Rejecting both of these expedients as being uncertain, and also fatal to the integrity of the nitrate bath, it seemed preferable to produce the effect by modifying the pyroxyline, since this mode is found to injure the bath scarcely or not at all. Having adopted an intense pyroxyline, it is of the utmost importance to secure a pure ether, because, when the pyroxyline is of the organic kind, the ether must be free from organic impurity, or the collodion will be less sensitive, and the negative either too intense or highly solarized.

Granting for the moment that the question of pyroxyline is definitely settled*, there re-

* There are some points relating to the theory of pyroxyline for photography which it has been deemed advisable to omit on the present occasion, through fear of complicating the subject. For instance, an in-

mains still an important matter to be considered in relation to photographic collodion. Are we to work with iodide only, or with mixed iodide and bromide? It seems certain that, if bromide could be invariably used, we should at once emerge from many of those difficulties which now surround us; for the invisible image on the bromized collodion is of a comparatively stable kind, and is less affected in its development by those small disturbing causes which often upset, so to speak, the latent picture upon the simply iodized collodion, and cause it to present itself either with spots or comets, or a totally reversed gradation of light and shade. During the past summer it was my endeavour, as far as possible, to encourage the trial of bromized collodions; and in most cases where the light was strong, the result proved satisfactory; when, however, the image of the camera was imperfectly illuminated, the experiments were, with some few exceptions, reported as unsuccessful, and the pictures pronounced weak and ineffective, unless the negatives had been artificially strengthened by bichloride of mercury, or some analogous process.

In conclusion, I would venture to ask the members of the Blackheath Society to lend their aid in settling this important matter. The present time is the best, because the interest of photographers has been aroused, and an opportunity seems to offer of establishing the manufacture of collodion upon a secure and well-understood basis.

At its conclusion, Mr. Heisch remarked,—I have listened with great pleasure to Mr. Hardwich's communication; and while cordially agreeing with much that he has said, there are still one or two points on which my experience has led me to slightly different conclusions. I am not altogether prepared to discard the use of paper as a material for the manufacture of collodion, as I believe that there are certain properties possessed by such collodion which cannot be secured by the use of cotton. I believe that a greater weight of pyroxyline may be dissolved in a given quantity of ether or alcohol, and still run well, when we use paper, than when we use cotton; and this is often of importance. I have not found collodion thus prepared more subject to decomposition than any other, if proper care be taken to secure pure ether and alcohol. During the heat of last summer, my dark room was for a long time at a temperature of 96°; and in that room I kept and used the collodion, not only for wet but for dry plates, and got on perfectly well, while many of my friends, using the same process with other collodion, were brought up by the heat, and could not use their plates. I have still by me collodion prepared eighteen months ago; and it shows no sign of spoiling. I do not mean to say I should recommend collodion such as I am now speaking of for all purposes; indeed, I fear it is impossible to obtain any collodion which will suit the requirements of all photographers, the circumstances under which they work being so different. Thus, a collodion admirably adapted for portraiture in a glass house, is hardly that which one would choose for copying new stone buildings in a bright sunlight, nor that, again, the same as for dark foliage; and it is a question, whether the requisite differences can be obtained with one pyroxyline by variations of solvents or iodizers, or whether it will not be found necessary to vary the pyroxyline itself. The purposes for which I chiefly employ collodion are such as do not require any great amount of sensibility, but rather the capability of standing considerable exposure without solarizing, so that the bottoms of deep holes of different colours may be brought out before the lighter portions are burnt up. The pyroxyline I employ is prepared with—

Nitric acid, sp. gr. 1430	39 parts.
Sulphuric acid	31 „

Swedish filtering paper is soaked in this for one hour at a temperature first of 130° to 135°, and allowed gradually to cool, keeping it well shaken for the first ten minutes, to bring fresh portions of acid constantly in contact with the paper. The solvent is ether, five parts, and absolute alcohol three parts, including that in which the iodides are dissolved. For very large plates I should use six grains of pyroxyline to one ounce of the solvent; for anything up to ten and eight inches, eight grains. This collodion, besides its non-liability to solarization, is remarkably well adapted for dry processes, losing its sensibility less in drying than most. I have recently tried with this and another collodion iodized precisely in the same way: though the latter worked in one-third of the time when wet, after drying it required nearly double the time requisite with my collodion. With regard to the question of bromides in collodion, the Society are aware that I have devoted much attention to the subject.

tense collodion may be made from pyroxyline prepared without any excess of sulphuric acid, if the amount of water be diminished, and the temperature raised sufficiently to disintegrate the fibre (a little chlorine in the nitric acid will assist in this disintegration). This material, however, appears less stable than the other, and, when examined, is found to contain a bitter product of decomposition in some quantity. Probably the acids convert a portion of the cellulose into grape-sugar, which, when acted on by nitric acid of a certain strength, forms nitroglucose. The experience of the author is unfavourable to the employment of this pyroxyline in photography.

I am not prepared to advise their use on all occasions, more particularly for portraiture; in landscape collodion, I think them always useful. I see no reason to doubt the truth of what I stated to the Society on a former occasion, that they should be used in atomic proportions: for subjects in which greens predominate, two atoms of iodide to one of bromide I still believe to be the best; indeed, I should take this as a general landscape collodion. I may mention, as confirming this view, that, since I first published this formula in 1852, several others, uninfluenced by theoretical considerations, but simply going on adding bromide till the best working-point was reached, have published formulæ in which the bromide and iodide are precisely in the proportions above mentioned. For reds and yellows, I believe the proportion of bromide may be advantageously increased. Our late President, Mr. Glaisher, finds that for artificial light, in which the yellow is very predominant, two atoms of bromide to one atom of iodide give the best results. This formula was also arrived at purely experimentally. When, some time ago, Mr. Hardwich spoke on this subject, he thought I had recommended too large a proportion of bromide. I observe in his last formula he has much increased the quantity he first employed; and I am not without hopes of ultimately converting him to the "atomic theory" as applied to this subject.

A vote of thanks was cordially tendered to Mr. Hardwich for his able communication; and Mr. Vernon Heath having been duly elected a member of the Society, the meeting adjourned.

The Aid of Photography to Military Purposes.

On the 27th ult., in a lecture delivered at the Royal Institution, "On the recent Applications of Science to the Efficiency and Welfare of Military Forces," the lecturer, F. C. Abel, Esq., Director of the Chemical Establishment of the War Department at Woolwich, remarked that they were very much indebted to the photographic art, inasmuch as there were photographs in the Arsenal Library, which conveyed more information than could be given by any other means of description, of the results of important military experiments.

Great Demand for Photographs by the Public.

Last year we had the pleasure to announce that the Council of Education had determined that the public should be supplied from the South Kensington Museum with positive and negative photographs at very reduced prices, specimens of the cartoons, and other valuable photographs of pictures, articles of vertu, &c. We are sorry to find that great regret exists, with those who are anxious to possess this boon, at the time which must elapse before they obtain their desires. The demand has exceeded all reasonable anticipation, and, notwithstanding the large number supplied, we are told that orders for which payment has been made to the amount of upwards of £8000 remain unexecuted. The Sappers and Miners cannot print fast enough. To give greater facility, the Council are erecting a large additional building, specially adapted to photographic purposes.

Books Received.

"Practical Hints on Photography—its Chemistry and Manipulations." By J. B. Hockin.

"The Fothergill Dry Process in Photography; its simplicity and certainty. Addressed especially to Amateurs." By Robert D. Hall.

The Archer Fund.

ADDITIONAL CONTRIBUTIONS.

	£	s.	d.
F. Maxwell Lyte, Esq.	3	3	0
F. York, Cape Town	2	0	0
Per Mr. Vernon Heath	0	10	6

The Secretary has received fifty prints each from Mr. Fenton, Mr. Turner, and Mr. White, for distribution amongst the members of the Photographic Society. As soon as the remaining contributions have been sent in, the division will take place.

Those Exhibitors who have not already received their free-admission card to the Crystal Palace will do so during the present week.

Mr. Joubert's print will be positively issued with the June Number of the Journal. It has been a source of great regret to Mr. Joubert that unavoidable circumstances have caused the delay. Nearly two thousand copies are ready, but it has been thought advisable not to issue any copy of the 'Journal' without the accompanying print.

To the Editor of the Photographic Journal.

Sir,—Mr. R. F. Barnes, in his paper on the manufacture of collodion, advocates the use of chloric ether, as tending to quicken the action of collodion in dull weather. Does he mean the chloric ether of the chemist—chloride of ethyle—

$$ÆO\ HO+H\ Cl=Æ\ Cl+2\ HO,$$

or the solution of chloroform in alcohol, called empirically "chloric ether" in pharmacy? Photography is so precise an art, that all ambiguity of language should be avoided.

Querist.

CORRESPONDENCE.

All communications for the 'Journal,' and on business relating to the Photographic Society, may be addressed to the Secretary and Editor at Messrs. Taylor and Francis's, Red Lion Court, Fleet Street, E.C.

The Rooms lately occupied by the Society at No. 1 New Coventry Street, W., are now entirely closed.

Gentlemen desirous of admisssion into the Photographic Society, are requested to communicate with the Secretary.

J. F.—You will receive a communication. The picture has been sent.

C. A.—The Society cannot be responsible for the safety of works exhibited after the close of their Exhibition; they should be removed at once. Instructions have been given that yours shall be safely packed and returned as you desire.

R. P. W.—1. Some boxes of the description you name were exhibited by Messrs. Murray and Heath at a former Meeting of the Photographic Society. 2. So much difference of opinion exists, and perhaps we may add party feeling also, that we can hardly advise you; but you will be safe by trusting yourself in the hands of those of known respectability.

J. J. S.—Your request shall be attended to.

G. Salter and others.—The delay has been unavoidable, but with the June Number the print will be issued.

H. A. J.—The price you have paid seems to be liberal, and the effects ought to be satisfactory. When you visit London, if you will call at the printers of the Journal we shall be glad to afford you that information which can hardly be done by letter.

Sir,—In the last number but one of the Photographic Journal, No. 95, page 190, under the head of "Correspondence," viz. answer to G. H. (Halifax), in the third division of your kind communication, you have described a method by which the high lights of a collodion glass positive may be rendered of an ivory-like appearance, by the previous addition of glacial acetic acid to the protonitrate of iron solution, in the proportion of forty drops of the former to an ounce of the latter. Anxious to obtain so desirable a result, I have carefully and repeatedly tried the above-named developant, but have as often failed in getting an ivory-like deposit of silver,—the deposit of organic matter with the reduced silver necessarily causing the picture to be of a darker hue, thus entirely destroying the peculiar beauty of the high lights when developed with solution of protonitrate of iron alone.

If you would oblige me with the additional information, by which I might arrive at results similar to those described by yourself in your useful periodical, or kindly explain the probable cause of my want of success, I should feel obliged to you for the favour conferred.

H.

Your protonitrate of iron should be recently made by the mixture of sulphate of iron and nitrate of baryta. If a strong solution is used without any acid, the deposit becomes almost as bright as a daguerreotype. But it is very difficult to make it flow rapidly and evenly over the plate. The addition of the acetic acid not only causes the fluid to run freely, but produces a beautiful white, ivory-like deposit. Varnish, however, to a great extent diminishes the softness and beauty of these pictures; they must consequently be carefully protected in the way in which daguerreotypes were formerly preserved.

W. A. A. has sent us specimens of his failures in the dry process from keeping his prepared plates in deal boxes. We believe that operators have been fully cautioned against this by all writers on the subject.

A Would-be Photographer.—It signifies little which chloride you combine with the albumen, so far as colour is concerned in the future picture; but the chloride of sodium is objectionable from its being affected by a damp locality, which would have little effect on barium or ammonium.

Sir,—Can you give me any information as to the instantaneous process employed for glass stereoscopic transparencies? and what work would you recommend on taking stereoscopic pictures, transparent and otherwise, by the best processes, albumen, collodion, &c.?

S. T.

If a plate prepared for the Fothergill process be used, as paper is, under a negative, and then exposed for a few seconds, a beautiful transparency on glass will be produced by the usual development. Fothergill's process acts admirably for positive transparencies. We have not yet tried the malt process, described in our last, but the author strongly recommends it for positive transparencies.

Edinburgh, April 30th, 1860.

To the Editor of the Photographic Journal.

Sir,—You published a dry collodion process by Mr. John Macnair, in the last number of the Photographic Journal. If this gentleman will refer to page 141, No. 28, of the Photographic Journal, published March 20th. 1855, he will find that his process is not a *new* one.

A. Wood.

Letters received from Alfred T. Heath, Mr. Joubert, Mr. Thomas, Mr. Alfieri, H. P. Robinson, Esq., Paul Pretsch, Mr. Judge, Mr. Hislop, and C. Thurston Thompson.

Mr. Sutton's Communication is in type, and will appear in our next.

Letters of inquiry to the Editor can be answered only through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. Taylor and Francis, Red Lion Court, Fleet Street.

[illegible]

Photographed from Nature by C Silvy

THIS PRINT IN PERMANENT INK,

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THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 98. JUNE 15, 1860.

We publish with the present Number the print announced some time since to have been presented by Mr. Joubert, which, we hope, will be found acceptable to our subscribers, being, we believe, the first carbon print which has been obtained *photographically*, for the purpose of an extensive publication.

Although many attempts have hitherto been made to attain the desirable object of "*a permanent impression*" from the photographic image by employing a durable medium such as carbon, instead of the nitrate of silver process, which it is much feared offers no condition of durability in the result, the difficulty of adapting the ordinary mode of printing photographs in a negative (or in a positive) form to the use of a permanent and positive *colouring matter* of a calcined nature, was found such that, at one time, but little hope remained of arriving at any satisfactory result.

However, after incessant efforts and perseverance on the part of the inventors of the present process, the mechanical means have been so far brought into working order that this process will no doubt receive much development, at the same time that it will gradually be perfected, being capable of adaptation to any size or class of subjects, and we shall be glad to have been the means of first introducing so valuable an invention to the public.

At present Mr. Joubert has not published his process, but we are authorized to state that it is his intention to do so. We have received several letters on the subject of the probable cost of prints thus executed, which we are informed is considerably below the present charges of photographs printed by means of silver; but Mr. Joubert having kindly made a free present of the accompanying specimen, we have not concerned ourselves with the business department, and would beg to refer all inquirers to the inventor, 36 Porchester Terrace, W.

The scene forming the subject of this print was taken in Paris last year at the onset of the Italian campaign, when the first "order of the day" addressed to the French army was published by the Government on the walls of Paris. A number of workmen have gathered round the bill just posted up, and are reading it eagerly.

THE WEATHER[1]

"The bosom of yon dripping cloud," from which Thomson invoked Spring with its ethereal mildness to descend, answered the appeal, this year, with a vengeance. During a brief time only in the middle of May did the sun shine out as it becomes a spring sun to do, and upon a larger body of enthusiastic votaries than ever paid him homage in the palmiest days of the disciples of Zoroaster. For enthusiasm in their art is perhaps one of the most marked characteristics of photographers; whether experienced children of the light of science, or untiring tyros producing only positives of persons who appear to have sat in a thick fog after a previous rolling in black-lead. We should not like to have on our conscience all the growls that saluted the morn—the cloudy rain-portending morn—with which the average of days began during the cold, dank, drizzly three months which this year represented what constituted authorities call the "merry spring time."

It *was* very aggravating. For the calm days of spring sunshine, whilst the grass is so green and clean and sharp, and the trees not too thickly foliaged to conceal their individual forms, and shut out the chinks of light amid their leaves—when the boughs are stiff in their vernal strength, not shaken by every

passing breeze, and have none of those faded reds and yellows which defy the art in autumn time—these are the very choicest days of the year for the out-door photographer. But this season his camera and tent, perforce, lay idle. It is true there were a few bright but sloppy days. Even then, however, the process was necessarily a very-wet-collodion one, and the unfortunate operator, slipping about in his tent, had often to wipe off the results of his dark slide.

Throughout Europe the spring is reported to have been similarly inauspicious, until an illiterate correspondent in an Italian province answered a question as to the position of the reigning powers, by replying that it only rained cats and dogs.

As it was in the spring, so it has continued throughout the early summer time; and even in the middle of June the rain it raineth every day, and it never rains but it pours. Surely Oberon and Titania must have been at loggerheads again, as in that "middle summer spring," the results of which are so wondrously told in the second act of the 'Midsummer Night's Dream.' In truth, it has hitherto been a disappointing year for the enthusiastic lovers of the art, anxious every day to be at their work, wishing real the poetic and patriotic fiction about "England on whom the sun never sets;" or perhaps sometimes tempted, a little irreverently, to repeat the words of Joshua (so fittingly inscribed on the tomb of Galileo), "Sta, sol, ne moveare."

Exhibitors of photographs in the late Exhibition of the Society, now removed to the Crystal Palace, who are desirous of selling copies of the works there exhibited, may arrange for the sale by forwarding to Mr. G. Grove, Secretary at the Crystal Palace, copies of the same, each marked in pencil on the back, with the price to be asked for it. The Company will charge a commission of 10 per cent. for the sale on all copies sold.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

PHOTOGRAPHIC SOCIETY OF LONDON.

Ordinary General Meeting.

Tuesday, June 5, 1860.

P. Le Neve Foster, Esq., M.A., V.P., in the Chair.

The Minutes of the last Meeting were read and confirmed.

The Secretary then read the following letter:—

"The two Photographs which are now presented to the Photographic Society of London, were taken in St. Petersburg by Monsieur Denier, a Russian artist, who is universally acknowledged to stand the highest in Russia in this branch of art.

"Mons. Denier being desirous to make his talent known in England, is anxious for the opinion of the Society upon these two samples of his art: he has a large photographic establishment in St. Petersburg, and his highest ambition is to become a foreign honorary member of the Society.

"The military gentleman represented in one of the photographs is Admiral Lutcke; the other is a likeness of the artist Plushart."

A vote of thanks was awarded to Mr. Denier.

The Secretary also read a letter from Captain Biggs, of the Bombay Artillery, as follows:—

To the Editor of the Photographic Journal.

Belgaum, April 7th, 1860.

Sir,—I have forwarded overland, and through Messrs. Richardson Brothers, Cornhill, a small tin case, to your address; it contains some positive pictures of subjects in this country, chiefly foliage, which I beg you will present to the Society in my behalf. The pictures will not, I fear, bear the scrutiny and comparison they are likely to be subjected to; but it must be recollected that in this country innumerable difficulties have to be faced and overcome, and there is but little opportunity for the amateur to follow the improvements almost daily introduced at home, every appliance, ingredient, and convenience being readily procurable there, whereas here the ordinary chemicals cannot be procured fit to use, though three times the English price is charged.

The positives are, as you will readily see, from paper negatives. I have steadily followed the Talbotype process, on Turner's negative paper, and find it answer better than any other process. They are printed on Marion's paper with ammonio-nitrate, fixed in a *fresh* hyposulphite bath, and afterwards toned in a

toning bath and well washed. I find Marion's paper difficult to manage; for if not printed on within half an hour of preparation, it becomes *greatly* discoloured, and with every care the sky is always a little *coloured*. The lens I use is one by Ross, and I have never seen a better; it was presented to me with a complete apparatus by the Honourable Court of Directors in 1854.

It is quite impossible to procure good chemicals in this country; it appears that the refuse is sent out from England, and more than double the English price charged for the same: so the only way is to procure paper and chemicals direct from England; and I believe the rubbish sold in this country is the cause of so much failure in the art.

The time of exposure for the Talbotype on the sea-coast is less than in England, viz. 3 minutes with my single lens (4½ diameter); but here, above the Ghauts, and some 2300 feet above the sea, the exposure is from 12 to 15 minutes. Again, at the Falls of Gairsoppa, some 2000 feet above the sea, and on the edge of the Ghauts, I found the exposure 4 minutes.

Foliage is difficult to get in this country, on account of its *never* being *still* between 9 a.m. and 5 p.m., there being always a strong breeze from east or west; consequently pictures must be taken before 9 a.m., and then the time of exposure is considerably increased. On the coast this difficulty is not so great, and five minutes is sufficient for foliage: but though the island of Bombay presents some most beautiful subjects in foliage, I have never seen a good picture of any taken there; in fact, the art appears almost to have died out of Bombay.

I do not use collodion for anything but portraits, and find Thomas's the only collodion that can be depended on. I get it direct from Thomas for 16 shillings the pint, but am asked 23 rupees or 46 shillings the pint in Bombay —modest profits!!

The difficulties of travelling in this country, where there are no roads, and the consequent frequent breakage of glasses, however well packed, render all the processes on glass unsatisfactory when moving about, to say nothing of the clouds of dust always flying about.

In offering the positives to the Society, I have only to request that they may not be lent to be copied. I send them more to show that Indian foliage can be taken by the Talbotype, than as specimens of photography.

The thanks of the Society were voted to Captain Biggs.

Mr. Dallmeyer read the following paper:—

On the Nature of Distortion, as produced by the present forms of View-Lenses; and on a Lens, or combination of Lenses, free from this defect.

The subject I am about to bring under your notice this evening has already occupied, at various times, a considerable portion of the Journal of this Society, as also that of other journals, whereby I conceive the great importance of the subject is fairly indicated; such being the case, I trust you will bear with me if some of the points I may state are already familiar to some of you.

It will be my endeavour to bring before you the nature of distortion in the simplest and most familiar manner, avoiding as much as possible all formulæ and technicalities, since many practical photographers as well as amateurs, by their inquiries, show that they are as yet uncertain as to what they may expect of the performance of any particular lens or combination of lenses.

I beg to premise that my remarks on distortion of view-lenses will be limited to the two principal forms now commonly employed, and producing images on a flat screen, viz. 1st, the single achromatic or actinic meniscus, whether of the ordinary or any other form; and, 2ndly, the more modern lens invented by Professor Petzval, and sold under the name of Orthographic; and further, that these lenses, whether the one or the other, be furnished with a moderate-sized diaphragm or stop, affording what is called the necessary amount of "depth of focus."

Strictly speaking, depth of focus means a general want of focus; and this to a certain extent is unavoidable in all views, in which the various objects required to be taken are situated at different distances from the lens; for only one of these can be in absolute focus. The only remedy in this case is a sufficiently small diaphragm, which shall so far reduce the various pencils proceeding from the different objects, that the circles of confusion necessarily produced by those out of focus shall be so small, as to be all but invisible to the unassisted eye. Those who are familiar with formulæ will readily find the necessary data for computing this amount in any of our elementary books on Optics.

But perhaps I may be here allowed to caution photographers not to resort to the use of very small diaphragms, if it can be avoided; for another very serious obstacle to definition will present itself, due to the aberration from diffraction or inflection of light. Any one who is in possession of a tolerably good telescope may at once make himself practically acquainted with the existence of the aberration alluded to.

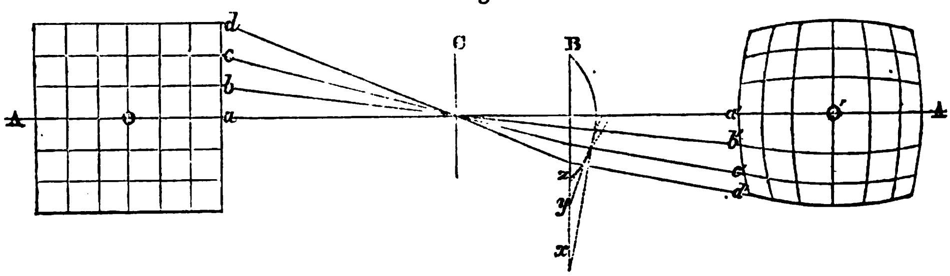
If the telescope be pointed to a minute object, say, for instance, a star, which appears as a mere point, and the aperture be then contracted to one-half, the star will no longer be seen as an optical point, but as a disc of sensible dimensions, and larger in the inverse proportion of the diameter of the aperture.

Now since every picture is made up of an infinite number of small points, if each of these be depicted as a disc, they must necessarily overlap each other, and the resulting picture will present a general want of definition. We are indebted to Professor Petzval for first drawing attention to this subject in connexion with photography. It is also fully treated of by Sir John Herschel in his excellent article "Light," in the 'Encyclopædia Metropolitana,' to which I would refer those who wish for further information. I believe also a pamphlet or paper was published some years since, on the same subject, by the present Astronomer Royal (Mr. Airy), but which as yet I have been unable to obtain.

First, then, on the *nature of distortion*, as produced by the whole group of ordinary view-lenses. Here, for the sake of clearness and simplicity, let me assume that the objects to be taken for a view are all situated in one plane, and at right angles to the general axis of the lens; and that it be made up of a number of straight lines, horizontal and vertical, forming as it were a number of squares: for what is true of these, will be true of buildings, &c., which are principally made up of such lines.

And now let us proceed to examine the form or shape of such an object or figure as depicted by this class of lens on the screen of the camera.

Fig. 1.



I beg to refer to figure 1 upon the board, where A A is a right line constituting the general axis of a view-lens B, which latter, for the sake of simplicity, I have merely represented by a single plano-convex lens, this being quite sufficient for the purpose of illustration. Let C be a diaphragm placed at the usual distance before the lens (about one-fifth of its focal length), and let O be the square figure before referred to, in place of a view. Now it is obvious that the diaphragm limits the several pencils as proceeding from the object, causing them to cross the axis A A at the place of the stop, before they are received and refracted by the lens, and thus different parts of the object are depicted by different parts or portions of the lens—*i. e.* the central portion of the object is reproduced by the corresponding central portion of the lens, and so on towards the margin; and since every lens may be conceived to consist of an infinite number of prisms, the refracting angles of which are formed by the tangents at the first and second surface, and which angles become rapidly greater in a convex lens as we approach the margin; if we now follow the course of a pencil of rays, or, as will be more convenient, the axis of such a pencil, as proceeding from the centre of our object O, we find that ray *a* suffers no displacement, and its direction is indicated by the general axis A A. If, in like manner, we pursue the course of ray *b*, and draw the tangent at the first and second surface of our lens, we obtain a prism the refracting angle of which is represented by *x*, and which, according to its value, will cause ray *b* to be refracted and bent towards the general axis A A, and we find its direction as represented by line *b'*. The next ray, *c*, proceeding from our object, falls upon that portion of the lens the refracting angle of which is represented by *y*, which being greater than *x*, will cause it to be more deflected, and bent towards the general axis A A; its direction is line *c'*. And lastly, ray *d*, falling upon the still greater refracting angle *z*, suffers greater displacement, and will be found to take the direction of *d'*. As before stated, I have merely followed the course of a single ray, but, as I premised, these rays represent the axes of the several pencils; therefore, having found their direction, and assuming the points of intersection to be situated in *a'*, *b'*, *c'*, and *d'*, we are enabled to construct figure O', which, as you perceive, no longer consists of straight lines (excepting the two central ones at right angles to each other),

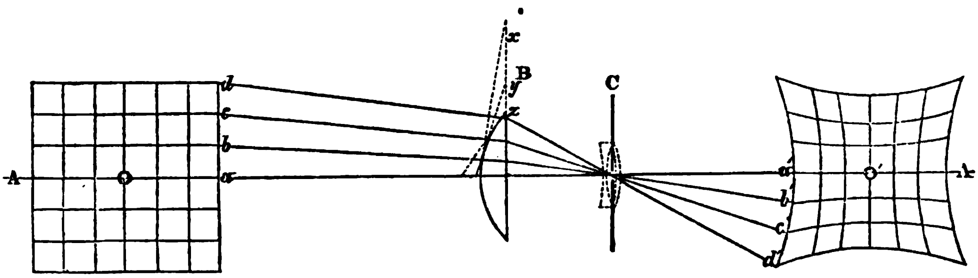
but curved ones, and increasingly so towards the margin.

Allow me here just to remark, that in this diagram, as well as the others I am about to exhibit, the object and its image have been drawn at right angles instead of parallel to the diaphragm and lens, for the purpose of more convenient illustration.

Gentlemen, you are all well acquainted with the inward leaning of architectural objects when taken with this class of lens, as represented by the figure on the board, and I hope that my familiar illustration has now sufficiently pointed out its cause. I now proceed to the second form of view-lens, viz. the Orthographic. A somewhat similar diagram to the one already employed will answer my purpose.

As before, let A A be the general axis of the single plano-convex lens B; let C be the diaphragm, which in this case is placed behind the lens; let O be the square figure in place of a view. Now in this case it is obvious that the rays, as, proceeding from the various parts of our object, they fall upon the lens, are

Fig. 2.



refracted, and then limited by the diaphragm situated behind the lens. Thus the same condition obtains with reference to different parts of the object being depicted by corresponding different parts of the lens; but in this case it will be observed that the rays cross the general axis *after* refraction. If we now follow, as before, the direction of the several pencils, or their axes, as refracted by the several parts of the lens, we find that ray *a* suffers no displacement; ray *b* falls upon that portion of the lens the refracting angle of which is represented by x, and is accordingly in this case bent out of its course, away from the general axis, according to the value of x; ray *c* falls upon the greater refracting angle y, and is consequently bent still further from the axis; and ray *d*, falling upon the still stronger refracting angle z, suffers a correspondingly greater amount of displacement.

If we now construct our figure as before, we again only obtain two straight lines, the rest being curved; but in this case the curvature is exactly in the opposite direction to that produced by the other form of view-lens. I have left out of consideration the negative combination, which of course forms part of the Orthographic, since it has no effect in regard to the displacement of the several pencils as occasioned by the first combination, except merely prolonging their foci.

What I have stated of the single lens is therefore not modified by the negative combination, which should be in the position of the stop, and the latter should be of the same size as that in the previous case. It will be readily understood that the amount of distortion in both cases, as brought before you, will depend (for the same size picture) on the focal length of lens, and the position of the diaphragm. Now in the second case (Orthographic) the diaphragm is somewhat nearer to the first combination, because the requisite amount of flatness of field is produced by the second or negative combination, and hence, upon the whole, the Orthographic produces less distortion. In regard to the two forms of lenses referred to, I may state that some years ago the present Astronomer Royal gave both positions of single lenses for the camera obscura, in his valuable paper "On the Spherical Aberration of Eye-pieces" (Cambridge Philosophical Transactions), in which the subject of the forms of the various pencils is fully treated, and to which I am greatly indebted. It is much to be regretted that the scientific world is as yet deprived of Professor Petzval's investigations which led to the discovery of the Orthographic form of lens; we are informed that he had the assistance of the Austrian Government to carry him through his protracted labours in this field. One or two pamphlets published by him have already been of great service, although they merely give a general outline of his doings: I refer to the theorem contained in one of them, viz. "The reciprocal of the radius of the image, as produced by a combination of lenses, at the point

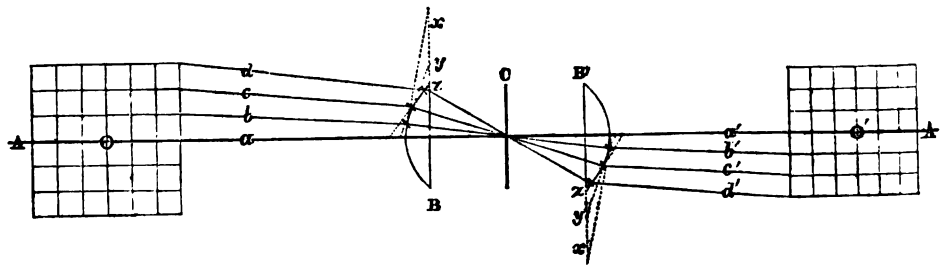
of intersection, is independent of the form of the several lenses, and equals the sum of the products of the reciprocals of the foci, into the reciprocals of the indices of refraction." [The Astronomer Royal, I believe, also found this to obtain in the case of the radius of the image as produced by the single lenses above referred to.] We have lately been told that after the completion of his (Professor Petzval's) "Integrations of Linear Differential Equations," &c., now publishing, we shall be favoured with the publication of the whole of his investigations,—which promise, I hope, will be fulfilled.

I now proceed to the *second* part of my subject, viz. *On a lens, or combination of lenses, free from distortion.*

Those who have attentively observed the nature of distortion, as produced by the two groups of view-lenses brought forward, in which that of the one is exactly contrary to that of the other, may have conceived the idea, that if a combination of both forms of lenses could be effected in one instrument, distortion might be corrected. And this can be accomplished.

Figure 3 illustrates this case. It will be seen that the refracting angles of the first lens are exactly opposed to those of the second; and if we follow the course of the several rays, as refracted by them, we shall find that they finally emerge parallel to the several incident rays, which is the condition required to be satisfied for the production of an image free from distortion.

Fig. 3.



To Mr. Rothwell belongs the credit of first suggesting the remedy, and to Mr. Sutton of bringing it before the public,—the only difficulty being, that when two positive achromatic or actinic combinations with their contact surfaces cemented were thus combined, the curvature of the resulting image was too great to admit of being received on a flat screen.

But being already familiar with the theorem before alluded to, I suggested to my late father-in-law (Mr. A. Ross), that a negative combination placed in the position of the stop, would have the desired effect of flattening the field.

I did not press the subject, because it appeared to me then, as it does now, that the expenditure of optical means for accomplishing such a purpose, at least for the smaller-size plates, is somewhat extravagant. Mr. Sutton, who had previously given a familiar illustration of the manner of action of Professor Petzval's negative combination, afterwards also suggested the use of such a one to perfect Rothwell's combination, and pressed my late father-in-law to construct the instrument; but I regret to say his wonted energy had already begun to fail, which I first experienced when assisting him in the construction of the Orthographic lens; and as Mr. Sutton only furnished the general outlines of such a combination, it was put aside, and there remains.

I may as well state that a combination of lenses so constructed, *can* be made to project straight lines on a flat screen, and include a large angle; but if we are restricted to only six reflecting surfaces, I believe it would only answer for views. My late father-in-law often expressed himself, that a lens free from distortion, if only obtainable for stereoscopic views, would be a great boon, and tend to the perfecting of the photographic art—urging upon me the great importance of constructing such an instrument; and ever since, the subject has received my earnest attention.

As already indicated, if we are not restricted in the expenditure of optical means, the desired end may be readily accomplished; but when the question of economics has to be considered also, it will appear that there are some difficulties to be surmounted. Moreover, my desire being, if possible, not to introduce another new lens for views only, I was led to consider whether, among the forms of lenses already extant and used, something might not be effected to make them possess the great requisite.

The lens most extensively used, and not likely to be superseded, is that employed for

portraiture; and here I have introduced the principle before explained, and made it subservient alike for portraits and views, free from distortion, as will be seen by the pictures exhibited. The portrait-lens, as constructed and left by my late father-in-law, though it has been used with diaphragms, was not intended for such a purpose, and therefore required reconstructing; one of the principal points being its great want of flatness of field, which in a portrait-lens is not very important, since the position of a person, when sitting, may be so arranged as to approach the necessary curvature; and besides, the swinging-back camera affords a remedy to some extent. But for the taking of views, flatness of field is one of the greatest requisites; and to obtain it great difficulties are encountered, as will be readily understood by those who comprehend the theorem above alluded to.

As the result of protracted investigations on this subject, I have approximated to a mean between astigmation and roundness of field, and I believe with complete success.

The advantages then of my lens, or combination of lenses, for portraiture, are,—1st, increased rapidity of action over the whole extent of plate; and 2ndly, a flatter field.

When employed for views with the usual sized diaphragm, it is free from distortion, has a flat field, and includes an angle of upwards of 50°, which is at least 10° more than is taken in by the forms of lenses above referred to; and since the increase of angle is virtually equivalent to a lens of shorter focal length, a proportionately larger aperture may be employed, still retaining the required amount of "depth of focus." A great objection therefore, as appertaining to the Orthographic lens, in which the time of exposure is much greater than in the ordinary form of view-lens, on account of its numerous reflecting surfaces, is set aside.

Since, however, many landscapes are nearly free from buildings, and in such the subject of straight lines or distortion not being important, I have so constructed my portrait-lens, that by unscrewing the back combination, and replacing it by the front, it is at once converted into an ordinary form of view-lens, and may be employed as such.

In regard to stops or diaphragms, they are so arranged that, counting from the largest to the next size smaller, the time of exposure required to produce a picture is doubled, whereby much time lost in computing and experimenting will be saved.

In conclusion, Gentlemen, permit me to observe, if it should be found that the instrument, which in the hands of my late father-in-law attained so great a measure of perfection, has been still further improved, and rendered more extensively useful, especially in producing an image practically free from distortion, I shall be amply rewarded.

Mr. Malone asked how many surfaces there were in the altered portrait lens?

Mr. Dallmeyer answered six.

Mr. Shadbolt asked what was the equivalent focal length?

Mr. Dallmeyer said, about 12 inches with the 3¼ inch front, and 3¼ back lens, which was nearly the same as, but rather shorter than the lenses made during the last four years, and there was no material difference in time. He said that he had not adopted the most elegant manner of proving his position, but had availed himself of a familiar means of illustrating the angles of distortion. He stated that the form of the front lens as left by his late father-in-law, did not admit of its being used as a single combination. He (Mr. Dallmeyer) had so constructed the front combination that, by merely unscrewing it and placing it in the position previously occupied by the back combination, it was at once converted into an ordinary view lens.

The Chairman invited discussion.

Mr. Shadbolt said, his memory was bad as to dates, and he therefore was a little troubled to define the *exact* time of occurrences to which he should allude. He was much disappointed at not finding any novelty in that which was brought forward. He had in his possession a lens made by the late Mr. Archer that comprised nearly all, if not absolutely all, the principles involved in the one described by Mr. Dallmeyer. He (Mr. Shadbolt) could vouch for his possession of the lens for upwards of seven years; but whether he had possessed it eight or nine years he could not recollect. He had resided in the house which he now occupied for seven years on the 3rd of last March, and he took Mr. Archer's lens into the house when he first occupied it; consequently he was clear upon that point. The front lens fitted into the back screw of the mounting, and was the lens which he commonly used as a landscape lens; and a better landscape lens he had never yet seen of any one's manufacture. As a double combination lens it was constructed of the ordinary form, after the formulæ of Prof. Petzval and the late Mr. Ross and the present Mr. Ross—that is to say, the front being a cemented compound, and the back being a separated compound: but in addition to that, the diaphragms are placed between the lenses at a distance corresponding to the respective foci of the combinations of the lenses—that is to say, being somewhat nearer to the front lens, which is of a shorter focus than the back; and it is the position of the diaphragm which cures "distortion," and the introduction at that place of a small concave lens which lengthens out the focus, precisely in the manner Mr. Dallmeyer has described. In his case the small concave lens was added subsequently to the construction of the lens. It was not added by Mr. Archer, but by himself (Mr. Shadbolt), from hints given to him by Mr. Archer. He (Mr. Shadbolt) could vouch for the fact of those hints being given to him five years ago, if not six. Mr. Archer was then using for landscape work a lens constructed precisely like the one he was now using. Mr. Archer showed him that lens, and his particular object in connexion with its use was the advantage he found in taking interiors, where he was frequently limited for space and wished to get a considerable angle. But he (Mr. Shadbolt) thought Mr. Dallmeyer had a little slurred over the fact, that in order to obtain freedom from distortion he must sacrifice a certain

portion of flatness of field. He had not described the mode in which he had altered the ordinary portrait lens; but from what he had stated, he (Mr. Shadbolt) presumed Mr. Dallmeyer used a back and front combination of identical focus with a concave between them—in point of fact, taking up just what Mr. Sutton had alleged as being his symmetrical triplet. At the time that that triplet was brought forward, he (Mr. Shadbolt) pointed to the facts to which he was now alluding, and consequently alleged that there was not the novelty that was supposed to exist in the lens. He was not aware that Mr. Archer did very publicly bring forward that lens; but that he made and sold several of them he did know, both from Mr. Archer himself and from his late wife. He (Mr. Shadbolt) saw several of them in his possession at the time that he first of all showed him the mode in which he was then working. As he (Mr. Shadboldt) was not aware of any public statement of the fact by Mr. Archer, it was possible that neither Mr. Sutton nor Mr. Dallmeyer had heard of it. But certainly, at the time that Herr Paul Pretsch introduced Petzval's Orthographic Lens, he (Mr. Shadbolt) did publish a statement to that effect,—he believed, about two years ago—certainly eighteen months back. He pointed it out then; and subsequently, when the so-called Lens Committee of the Scotch Society issued a very droll Report upon Lenses, he pointed out the fact that they assumed to have discovered something extraordinary—that the position of the diaphragm in front of a lens produced the barrel-shaped image of a square original, and the diaphragm behind produced the hour-glass-shaped image. That was not novel to him, and he did not presume that it was novel to many others; yet still that fact was pointed out, both at the time that Herr Paul Pretsch brought forward Petzval's modification, and also at the time when the Scotch Society issued its Report upon distortion. It has been frequently remarked that in optical instruments you can very rarely get an advance in one direction without a sacrifice in another. If Mr. Dallmeyer could assure the Society that the alteration which he had made in the Portrait Lens, did not sacrifice anything either in definition or curvature of field, then he presumed Mr. Dallmeyer's must be considered as an advance in the construction of the instrument. Unless Mr. Dallmeyer could show that he had sacrificed nothing, he was afraid they were where they were before, except that they were simply substituting one error for another. He (Mr. Shadbolt) had no other object than simply to draw as much out of Mr. Dallmeyer for public information as could possibly be obtained.

Mr. Malone said, he should not be deterred by the observation that some Members endeavoured to speak upon every subject; he considered it their privilege—more than privilege, it was their duty—of course always endeavouring to speak to the point. He would at once confess his great ignorance of theoretical optics. He would not pretend to enter into any philosophical discussion of the subject; and he regretted there were not more gentlemen present of Mr. Shadbolt's degree of attainments. He (Mr. Malone) might mention that he had always thought that the late Mr. Ross should have been attached to the Society in a permanent manner; but his suggestion was overruled, and it was said that Mr. Ross was so connected with trade that it would not be well to place him on the Council. He (Mr. Malone) regretted that sort of feeling to this day. He could not, of course, but welcome Mr. Dallmeyer's presence at the meeting, and the Society must give him all credit for the present illustration of his subject. He (Mr. Malone) then stated that, having made these introductory remarks, he must say that it certainly was very clear, as Mr. Dallmeyer had said, that photographers generally not having that intimate knowledge of this subject which would enable them to know sufficiently what to expect from a lens, it was only by trying it that they got any idea at all about it other than that which they got from the makers and sellers of lenses, and that which was occasionally written upon the subject. They were often much perplexed. They knew that it was the business of the maker of the lens to make the best of his invention. In trying to disparage a lens, care must be taken that it be done with judgment; and without taking upon himself to be a general censor, he would just point out how it appeared to him Members occasionally erred. The late Mr. Ross had a strong opinion, speaking generally, that those writers and gentlemen who took part in optical discussions had what is called school knowledge, which might be sufficient to enable them to take some part in discussions and to understand the nature of improvements suggested, but hardly justified them in giving to an optician in full detail the plan of procedure by which he should make a good new lens. Now this was one case. They have a suggestion made by a person only partially competent, who requires such practical men as Mr. Ross and Mr. Dallmeyer to work it out for him—which, of course, they do not want to do, as it involves a great amount of labour. Photographers had a right to speak in a general way on these subjects, even though they were not possessed of that knowledge, theoretical and practical, which entitled them to dogmatize. In addressing himself to the subject as a photographer, and speaking as a practical photographer handling many lenses, his impression was that Members ought to hail and welcome cordially any attempt to produce a lens that will give straighter lines. If without loss of flatness of field or definition, so much the better. Let them take any invention offered to them, and look well, calmly and dispassionately, to see whether there were any advantages of which they could avail themselves. He hailed with satisfaction the introduction of the Orthographic Lens, and he had expected to get better results than he did, for they had been told it gave lines straight. Now there was a fallacy involved in that promise: for instance, if a picture of a gateway were examined, the lines of the gateway would appear to be straight, because they did not fill the whole of the picture; but the lines were not straight. It was only a kind of artifice; but that kind of artifice was sometimes of service to us. There was no doubt that the Orthographic or Orthoscopic Lens would on the whole be a better lens than the old form of view-lens, but it was seen at once that there were many things to discriminate. They found that in taking a view of a street with the corner of another street running into the picture, that corner would be represented by a curved line; and if that corner of the street ran into the whole length of the picture, they would, by the Orthographic Lens, have the buildings appear to be about to tumble over into the street, which would not be natural, and then they would probably prefer the old form of view-lens. Photographers could not altogether get rid of the necessity for the old form of view-lens; and it appeared to him that on starting out they must take the old form of view-lens, whether single or double, which gave the barrel-shaped picture, and the Orthographic which gave the pincushion shape; and if all that had been said at the Meeting was true, they would have to add this third lens. Mr. Dallmeyer had said that his portrait lens, in which he had lessened the distortion, might be taken in half, and one half used as a view-lens. The reason he gave for that did not satisfy him (Mr. Malone). Mr. Dallmeyer had said that in dealing with buildings with a view-lens they got the barrel-shape. Then he said that, if they took a landscape in which there were no buildings, the distortion was of no consequence. He (Mr. Malone) said it was of essential importance, and

that truth was of the first consequence. He would give an instance where it would be detected. If this single combination were taken to avoid any loss by reflexion in consequence of the number of reflecting surfaces in the whole combination, and a picture were taken containing trees which in nature were absolutely straight, the trees would be produced bent. They must not then go back to the old view-lens, or they would have the trees barrelled. He knew it would be said, who would know that they were barrelled? He wanted photographers to guard against that—deceiving others, and perhaps themselves. Let Members look at the three diagrams and say which they would prefer. He thought they must sacrifice a little definition if they could get straight lines. The result was that photographers would find all three lenses useful, and perhaps a fourth; for he was bold enough to think that they ought to have a very large double portrait combination for certain purposes to meet every possible case and to do the best under any circumstances; for every photographer knew the variety of circumstances under which he was sometimes placed when he was out in his excursions.

Mr. Bedford remarked that the objections made by Mr. Malone to the defects of certain lenses did prevail to a great degree. He (Mr. Bedford), for instance, had found the line of the horizon in a sea-view curved up or down, and the straight stems of the Scotch fir and larch bent to a serious extent, and he thought it desirable therefore, in order to be prepared for all difficulties, to take various forms of lenses now made. The £25 Portrait-Lens of Ross, when stopped down, was especially useful for such subjects as dark glens and interiors; the Orthographic for architectural views; and the old "Ross" View Lens, than which there was nothing better for landscapes and general use, as giving greater depth of view and a better average of perfection than any other lens. The Ortho. lens was no improvement for landscape purposes, although very useful and almost indispensable in some cases. He should like to have seen what this lens would do on larger plates. The lines certainly appeared remarkably straight; but there was, even in these small plates, a very perceptible want of sharpness at the edges, particularly in the copy of the 'Times,' where the outside columns were out of focus and blurred; but possibly the lens had not been worked under the most favourable conditions.

Mr. Dallmeyer stated that the aperture employed for the taking of the 'Times' had been 1¼ inch, which was much greater than it was customary to use for copying purposes, and therefore the 'Times' could not be regarded as a test of the capabilities of the lens in that respect. It would be found greatly superior to the old lens for copying, when worked with a fair aperture.

Mr. Hardwich said, he had lately been attempting to copy maps and pictures of a large size, and had been struck with the necessity of not too much lessening the aperture of the lens. He took an interest in the symmetrical triplet lens, or in any lens which promised an image free from distortion, and he would wish to hear an opinion as to what the chances were of getting a lens of that kind to cover a plate two feet square and to work within a reasonable time. Would the number of reflecting surfaces in the triplet be so great as to occasion a serious difficulty in producing intensity? He supposed that it was particularly in copying maps that the triplet would be used. Could it be so used without cutting off too much light? The next question he would ask of gentlemen who had used Petzval's Orthoscopic or Orthographic Lens on very large plates would be, how far the distortion was a serious matter? because only on the day of the meeting he had been measuring very carefully on plates 22 inches square, by fastening strings across a board, and taking the exact distances between those strings. Unfortunately, he was prevented finishing his experiments; but when he came away he had not succeeded in satisfying himself that there was any material difference. He rather thought that the distortion was so slight that practically it might be overlooked. He remembered a conversation he had with the late Mr. Howlett at the time the Orthoscopic was first made, and that gentleman said, the error was so small that he disregarded it. With his old form of lens, the lines of a map taken piecemeal would not meet; with his Orthoscopic the lines did meet. Some statements that he (Mr. Hardwich) had since heard were different. The size of the plate which he himself had used was 22 inches square, and the focal length of the lens 4 feet 2 inches. He had been engaged in trying to find an easy method of getting up the intensity with long-focus lenses. What he wished to do was to get rid of the bichloride of mercury. He believed they ought to discard the use of bichloride of mercury, for it was deleterious in baths; and, from what he had read lately, he believed it was difficult to get it off the plate again. He hoped that the optical part of the question was not concluded, for there were many readers of the Journal who wished for all the information it could give.

Mr. Malone thought it would not be out of place if he rose again to speak of an experiment which was pertinent to Mr. Hardwich's inquiry. He (Mr. Malone) made the experiment in conjunction with Mr. Ronalds, the Director of the Kew Observatory, when assisting him in carrying out the Photographic Registration there. Mr. Ronalds was extremely anxious to know whether he could rely upon photographic results as to measurements made from them. Mr. Ronalds, who is well skilled with regard to geometrical matters, drew a square foot on paper with square inches with the greatest possible accuracy. Mr. Ronalds asked him if he could copy that of the exact size, with the spaces true. Many experiments were made, and at last he succeeded in making a copy, which he believed he retained now, of the exact size of the diagram—a foot square, divided into inches, black and white of course. Mr. Ronalds measured the copy with square and compasses, and expressed himself satisfied with the result. He was surprised at his getting so exact a fac-simile. He was too cautious to say fac-simile, but it satisfied Mr. Ronalds's scrupulosity as regarded the practical point. He (Mr. Malone) made the experiments in conjunction with Mr. Henneman. The lens was made by Mr. Slater. It was a lens to take large portraits of some 4 or 5 inches' aperture; and it could be used either as two lenses together, or as one; or there was a third lens put in to shorten the focus. This third lens was a greenish glass, and very slow for portraits. But tried in this way with a stop, which he believed was an inch, he got that result; and his impression was that he could not have done it at that time with any other form of lens. [Mr. Shadbolt (*aside*): I think a spectacle glass would have done it.] He (Mr. Malone) added, that the late Mr. Ross impressed upon him the necessity, when asking what-sized plate a particular lens would cover, of explaining the object in view; that if about to copy a map with the lines to meet exactly, one ought to go to the expense of a large lens with a long focus, and the result would be that one would get a portion out of the centre of that curve which comes near to a straight line; but that, of course, involved expense. Therefore, seeing how near he could already effect his object, he had great hopes of Mr. Dallmeyer's new lens.

Mr. Dallmeyer said he would not detain the Meeting long. In fact, one gentleman had almost spoken in reply to another with reference to distortion and amount of distortion. He would explain the reason of his bringing his paper forward. It was due to the fact of his being continually asked what lens was free from distortion; and owing to this circumstance, as he

had stated in his paper, he conceived that the subject of distortion was not well understood by many photographers; and it was for those that he had written his paper, purposely abstaining from giving formulæ; for what he could give might be found in the works on Optics to which he had alluded. Gentlemen, seeing formulæ in a paper, often made the remark that, not being mathematicians, the subject did not interest them; he had consequently simply exhibited the diagrams. With reference to novelty, he claimed none. The lens was free from distortion, as far as that was obtainable; for he might state that a lens producing pictures on a flat screen absolutely free from distortion was well nigh an impossibility: the nearest approach possible required the lens to be as large as the picture produced, which was too expensive a matter to consider. Hence it was necessary to ascertain how far he could approach to the production of an image which was practically free from distortion, with means that were not extravagant; and it was by the focal length and focus of the combinations of lenses as described in his paper that the distortion due to the alteration in the direction of the pencils could be got rid of; and the distortion remaining was only that which was produced by the different lengths of the foci of the central and marginal pencils; for this lateral pencil ought to come to a focus nearer to the lens than this central one, and therefore a certain small amount of distortion, due to this, still remained. It was desirable to arrive at an approximation as nearly as they could. He believed that the distortion, as occasioned by the difference between the lengths of the central and the marginal pencils, was quite insignificant when compared to that shown in figures Nos. 1 and 2. He would correct a mistake: his lens when employed for views did not consist of two positive and a negative, but of two positive combinations only; the number of reflecting surfaces therefore was 6, and not 8, as in Mr. Shadbolt's combination, and as such it had been used. He had already stated that the number of reflecting surfaces in lenses where of necessity a small aperture was employed was a great objection, because the loss of light, if that number were great, would be extensive; and hence persons had found that with the orthographic lens the time of exposure as compared with the ordinary view-lens, was greater, perhaps double. With regard to lenses for copying, it was readily understood from what he had already stated, that the amount of distortion depended on the focal length of the lens: the longer the focal length, the less the amount of distortion. He would beg to say that what might be thought to be a chemical difficulty, might perhaps be an optical one, due to the aberration from diffraction; for if the amount of confusion produced by this aberration were taken into account for a long focal length of lens with a small aperture, it might be that it was that aberration which caused the confusion spoken of by Mr. Hardwich. He just threw that out as a hint, to be perhaps inquired into, so that one might not be misled in the *rationale* which he might form of the subject. With regard to a number of lenses being requisite at different times, that was one of the reasons why he had made his portrait-lens subservient to different purposes. Not that he wished to say, use the front lens alone, but, as the focal length of the front combination was different to the focal length of the two when combined, and as there might be at times a desire to produce pictures of different sizes, hence he had suggested in his paper the use of the front combination as a single-view-lens. With regard to the observations of Mr. Shadbolt, and his inquiry whether other important qualities were sacrificed to the obtaining of those sought after, namely, freedom from distortion and flatness of field, he had brought with him the pictures exhibited, by which he thought he had afforded the means of judging as to its merits in all respects. He had given its equivalent focal length, which expressed its rapidity, knowing its diameters were 3¼ and 3½ inches respectively. Therefore, as before stated, he believed he had not sacrificed anything to the obtaining of the qualities indicated. With regard to a copy of the 'Times,' as already stated, the aperture used was 1¼ inch for a focal length of 12 inches, which being about three times the size of that usually employed for such a purpose, the 'Times' therefore ought not to be regarded as a test of the copying qualities of the lens. The views exhibited had been taken, one in 4 seconds and the other in 8 seconds (over-exposed), from which the size of the aperture might be inferred. He would be happy to answer any further questions.

The CHAIRMAN, in tendering the thanks of the Society to Mr. Dallmeyer, stated that the subject was most interesting to photographers, although he feared that among photographers generally there were not many who had gone deeply into Optics; for he had generally found that when Optics had been brought before the Society, there were very few who rose to discuss it. He thought it would lead to improvements if photographers would study Optics, and particularly those lenses used in commerce. In the usual elementary books on Optics, he thought there was very little to the point with regard to lenses for this purpose: they go to lenses generally, and seldom go to the theory of oblique pencils; and therefore those who study the question must go to the papers of the Astronomer Royal, which the Chairman believed were the only published papers touching upon the point.

The Chairman wished the members a pleasant and a happy vacation, and adjourned the meetings until the first Tuesday in November next.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

THE Twenty-fourth Ordinary Meeting of this Society was held on Monday, the 21st inst., at the Golf Club House, Blackheath Hill; the President, CHARLES HEISCH, Esq., F.C.S., in the Chair.

The Third Annual Report of the Council was then read.

The Council of the Blackheath Photographic Society, in presenting to its members their Third Annual Report, cannot but congratulate them upon its present position and future prospects.

Established three years ago by about seven members, the Society has now increased to forty-two; and the Treasurer's Account annexed shows a balance of not less than £43 15*s*. 7*d*. in favour of the Society.

Its prosperous financial condition is to be attributed in no small degree to the courtesy of the Golf Club, at whose rooms the Society's meetings have been held during the past year. The Council beg to tender their best thanks to the Officers of the Club for their continued kindness.

During the Session 1859–60, the Society's

meetings have been numerously attended, and the following list of Papers read before it testifies to the zeal and energy of its Members. The Council take the opportunity of here acknowledging the kindness of the Press in all that relates to the publication of their transactions, referring especially to the 'Photographic Journal,' the 'Journal of Photography,' the 'Photographic News,' and the 'South London Journal.'

Papers read before the Society up to the present period of the Session:—

"On the Application of Photography to investigations in Terrestrial Magnetism and Meteorology, as practised at the Royal Observatory, Greenwich." (Concluded.) By the President.
"A Paper on Van Monckhoven's Cellulose Process, as investigated and practised by T. R. Wheeler."
"A Paper upon Positive Printing." By A. J. Melhuish.
"On the Employment of the Salts of Magnesium as Iodizers." By Charles Heisch.
"The Pistolgraph and its Use." By T. Skaife.
"The Method employed at the Royal Observatory for registering by Photography the Diurnal Variations in the wet- and dry-bulb Thermometer." By the President.
"On the Reproduction of Engravings, Prints, Ordinary Writing or Letter-Press on Prepared Papers by Contact in the Dark." By Charles J. Busk.

A review of the subjects touched upon testifies that the appeal made to Members by the Council in their last Report has been well responded to; but they would earnestly reiterate that appeal for original matter, to be brought forward at the Society's monthly meetings, feeling persuaded that their success will be promoted from this rather than from any other source.

The Council cannot point to any very striking contributions to the practice of Photography during the past year. The nature and composition of the photographic image—a question of high interest to the photographer—is still occupying the attention of chemists. The experiments recently made by Mr. J. Spiller, of the Royal Arsenal, Woolwich, published in the 'Philosophical Magazine' for March 1860, tend rather to confirm the conclusion of MM. Davanne and Girard that the image consists of a mixture of metallic silver with unchanged chloride, and are so far opposed to the views of Messrs. Maskelyne, Hardwich, Hadow, and Llewellyn.

The alkaline gold-toning processes are still receiving considerable attention, each modification having its particular advocate. The method, generally, bids fair to be a great improvement upon the old process.

The prints exhibited by Mr. Joubert, said to be from ordinary negatives, with printer's ink, are superior to any ink pictures yet produced; but as his process is still a secret, the Council can offer no opinion as to its practical application.

Cognate to the subject of Photography are the experiments of MM. Bunsen and Roscoe, lately detailed before the Royal Society, which will be read with great interest by every photographer.

An attempt has likewise been made to employ cotton dissolved in oxide of cuprammonium instead of collodion, recommended by Van Monckhoven as immeasurably cheaper, and, in some respects, more uniform in its composition than collodion. The process would appear to merit further trial.

Since the publication of the last Report the Council have the pain of recording the decease of two of the Society's Members—Mr. Hughes, of the Royal Hospital, Greenwich; and Mr. Howe, of Dartmouth Row—the latter a practical photographer. It may not be superfluous here to note the loss the scientific community has sustained in the death of Mr. Andrew Ross, the optician.

The Council have considered it expedient, during the course of the present Session, to present to Members of the Society, a Print, from a negative kindly lent by Mr. Glaisher for publication; and it is their intention, as far as the funds of the Society will permit, to follow that issue by one or more during the ensuing year, as may be determined by a Committee appointed by the Council for that purpose.

In conclusion, the Council congratulate the Members upon the high perfection to which Photography has arrived in its numerous practical applications, not less than upon the prosperity of the Society itself,—pressing upon them the necessity of research and original experiment as the true means by which advancement is to be hoped for, and feeling satisfied that what is added to the general store of facts not only promotes the character of the source from which it emanates, but becomes the property of mankind for ever.

The Minutes of the last Meeting having been read and confirmed, the President made known to members a plan which was being agitated for holding a *soirée* during the present season, jointly with other Societies in the neighbourhood.

It was moved by Mr. South, and seconded by Mr. John Harding, "That this Society join the Greenwich Natural History Society and the West Kent Microscopical Society in a *soirée*, to be held at some convenient time and place during the present season."

It was moved by Mr. Glaisher, seconded by Mr. Spurrell, "That this Society bear one-third of the expense of such *soirée*."

"That the President, two Secretaries, and Messrs. H. Terrel and Wood be appointed a Committee to meet that of the other Societies."

It was then resolved unanimously, "That a gold medal be offered to the Golf Club, as a recognition of their kindness to the Blackheath Photographic Society in allowing the meetings of the Society to be held at their rooms; such medal to be considered as a prize medal, to be held under regulations to be laid down by the Golf Club. The Secretary to procure patterns and estimates, to be placed before the Society at its next meeting."

The President then called upon Mr. T. R. Wheeler, who proceeded to read a paper on—

The Solar Spectrum in its Relation to Photography.

With the double view of occupying a portion of this evening, when nothing of more importance presented itself, and offering a short *résumé* to such members as have not had an opportunity of reading the very interesting report of Professor Roscoe, of the experiments made by him and M. Bunsen on the relative actinic power of light in various portions of the world, presented to the Royal Society, I have taken the solar spectrum for a text; and if I do not pretend to bring forward anything original on the subject, I trust that I shall succeed in arresting your attention while I place in correlative order some of the phenomena of that most important imponderable agent—light. We call it an imponderable agent, and so it is, for it exerts an influence, in common with heat and electricity, without adding to the weight or bulk of the substance acted upon; and we judge of its nature and amount by the force which it is capable of exerting, rather than by its tangible presence. The question, therefore, "What is light?" is one which is more readily asked than answered, and I shall not occupy time in discussing either the corpuscular or undulatory theory, or speak further, during this short essay, of many of the phenomena of light, which are so far foreign to my present object, viz. reflexion, refraction, polarity, and epipolic dispersion.

> "From matter streaming, it makes matter bright;
> Matter arrests it on its onward flight;
> And so I fancy 't will but have its day,
> And, when that matter endeth, fade away."—Faust.

The investigation of the imponderable agents is attended with considerable difficulty, it being often hard to separate abstract from concrete, force from matter. If the speculations of MM. Grove and Seguin be correct, there are only two things in nature—matter and motion: the former an "entity," the latter a "state." The facts associated with the action of the imponderable agents come under that class called in natural philosophy "ultimate"—that is, which resist analysis, and are rather subjects for speculation than perfect comprehension,—whose *effects* only we observe, and are but rarely able to refer to a *proximate* origin, while their *primary* causes will probably for ever remain with their great Originator.

In nature, however, analogy seems to be a leading principle,—nothing existing, as it were, isolated, and no abrupt transition being found to exist. On this account, Grove has framed his theory of a "homogenesis, or correlation of physical forces." In this sense, we conceive light, heat, and electricity to be cognate powers, one being convertible into the other by any circumstance which is capable of changing their *states*. But this change always takes place in definite proportions, and the quantity of one force expended is in direct relation to the quantity of the force generated.

A ray of light impinging upon a daguerreotype plate forming part of a galvanic circuit to which a galvanometer is affixed, sensibly affects it, and, at the same time, occasions a change of temperature, indicated by a thermometer. The change which light causes upon any sensitive surface is believed to be in its molecular arrangement.

Hence it appears to me that a close analogy exists between the molecular action of light and what is called "catalytic action" in chemistry, the latter being an impulse communicated by the molecules of a body in motion to those of a body in a state of rest, inducing a change in the latter without the motive body itself undergoing change. A familiar instance is known in fermentation; the presence of spongy platinum causes the chemical combination of hydrogen and oxygen gases with explosion; and, not to multiply examples, several instances of a similar nature are known to chemists.

The allotropic condition of certain chemical substances occasioned by heat, and which can only be explained by the supposition of an alteration in their molecular states, is another striking point of analogy between light and heat, electricity being sometimes an effect, and sometimes a cause of both. Having premised this, I proceed to the consideration of the proper matter of my discourse.

It is familiar knowledge that several portions of the prismatic spectrum, however produced, possess different physical characters, or, to speak more plainly, exert different physical actions; and it is equally well known that the red, the

least refrangible, the most slowly-vibrating rays are those which contain, so to speak, the heat-principle, or which, exerting a distinct influence upon thermometric variations, modify our climate, and are the proximate causes affecting the fall of rain and the current of winds,—while the most refrangible and rapidly-vibrating rays, those near the violet end of the spectrum, are chiefly concerned in chemical agency, and though not, in truth, the most highly illuminating, have nevertheless the most intimate relation with the photographer, inasmuch as by their influence those changes are effected on which his art depends.

The importance of the subject will be readily conceded; so great an interest has been attached to it by philosophers, that a serious question has arisen among them, whether the chemical ray were not a fourth imponderable agent, and the heat ray a fifth. A considerable portion of the 'Philosophical Magazine' for the years 1843 and 1844 will be found to be devoted to this discussion; and Prof. Draper, of New York, designated the chemical ray "Tithonicity," and our countryman, R. Hunt, "Energia,"—the latter a purely abstract, the former a purely fanciful term, neither of which have, I believe, been permanently received by the scientific world, or the category of imponderable agents extended to meet these theories.

To measure the amount and variation of these particular rays has always been a great desideratum with the philosopher and, *à fortiori*, with the photographer, and hence, from time to time, various actinometers have been proposed; and if, as Mr. Roscoe has well observed, any instrument could be invented to be worked on the principle which renders the thermometer so valuable, and which has been termed the first law of Marriotte—viz. that the expansion of the column of mercury is equal, with equal increments of heat—then a perfect actinometer would be presented to the public. To find such an arrangement, and to apply it to investigating the amount of chemical light in the ray in different parts of the world, was the object which MM. Bunsen and Roscoe proposed to themselves; and I shall confine myself for the present to a description, taken from Mr. Roscoe's report, of the mode by which they carried it into effect.

I have before stated that various photometers had been proposed, the principle of which was somewhat similar, by the exposure of certain chemical compounds to the action of light, such that either a re-arrangement of their constituents should take place under its influence, or actual decomposition with the extrication of some gaseous product, the amount of which being calculated, afforded an approximate conclusion as to the power exerted by the light. I shall first mention that of Sir John Herschel, in 1840, or more properly, perhaps, that of Mr. Jordan, in 1839. These were simply sheets of photographic paper wound round a cylinder enclosed in another cylinder, which was moved on its own axis, at a definite rate, by means of clock-work. The light being admitted through vertical slits in the outer cylinder, impinged upon the sensitive surface, and, by adjusting the rapidity of its movements so as to keep the slit always opposite the sun, the paper recorded every variation in its light. It may not be superfluous to state that the arrangement did not differ materially from that at present in operation at the Royal Observatory for registering the diurnal variations in the magnet by artificial light, under the able superintendence of our friend, the late President.

Mr. Hunt next produced an instrument, which he termed an actinograph, of a somewhat more complicated nature, but upon the same principle. Professor Draper, of New York, has, perhaps, devoted more time and attention to the question than any other philosopher. Commencing with the action of light upon surfaces of chloride and bromide of silver, he suggested an instrument, to which he gave the name of a Tithonometer, from "Tithonicity," the title he invented for the chemical ray. This consisted of a mixture of hydrogen and chlorine in equal parts, which, being exposed to light, were known to combine to form hydrochloric acid with such energy as sometimes to cause explosion. Other actinometers have been proposed; but this presents the special interest of being the one chosen by MM. Bunsen and Roscoe, with some modifications, which appeared to be approved by Professor Draper, for their extended experiments.

Before I proceed further with a detail of these experiments and their results, I may as well complete the history of photometry (mentioning incidentally the names of MM. Favre and Silbermann—the latter the inventor of the heliostat—and of M. Claudet, an experimenter in the same direction) by an account of other photometers which have been from time to time suggested, such as the peroxalate of iron proposed by Professor Draper, modified by Dr. Woods. It will be perceived that three distinct methods are recognized in the above description: the dry method, or simple exposure of a dry, sensitive surface to the action of light; the moist, where a solution of a salt, decomposable by light, is employed; the gaseous, where a mechanical mixture of gases is submitted to light, and, under such exposure, a chemical

combination occurs, together with the formation of a definite chemical compound. Where a solution of the peroxalate of iron is employed —which is naturally of a golden-yellow colour, and, in the dark, may be preserved unchanged for a great length of time, after exposure to solar, or even to artificial light—decomposition takes place; a pale yellow precipitate of protoxalate of iron falls down, and carbonic acid gas is evolved. The amount of this may either be estimated by weight or volume, or by the weight of gold or silver which the solution, *after exposure*, is able to precipitate.

The following equation will show the nature of the arrangement just described:—

$$Fe_2O_3, 3C_2O_3 = 2(FeO, C_2O_3) + 2CO_2.$$

Besides the peroxalate of iron, Mr. C. J. Burnett suggested, in 1858, an actinometer, in which the fluid to be acted upon by light consisted of the oxalate of uranium in solution, and the carbonic acid generated by its decomposition impinged upon a column of mercury, which rose according to the pressure, in a bent tube, to which was attached a graduated scale, —an ingenious and simple arrangement, and one infinitely more easy of application than that employed by MM. Bunsen and Roscoe, viz. the tithonometer of Professor Draper, but infinitely less sensitive where very great accuracy is desired.

The chemical ray, then, as has been shown, having a synthetic action upon a mixture of chlorine and hydrogen, in direct proportion to its energy and amount (it is stated by Professor Draper, that the light of the electric spark, whose duration does not exceed an infinitesimal fraction of a second, will cause explosion), MM. Bunsen and Roscoe availed themselves of the fact, by submitting a mixture of these gases, prepared from hydrochloric acid by electrolysis, or the decomposition of the acid by voltaic electricity (for the purpose of avoiding error), to a known quantity of light, estimated by comparing the illuminating power of a ray reflected by a Silbermann's heliostat through a small aperture into a dark room, with what they called a standard flame, such as the ignition of a jet of carbonic oxide of a given size produces at the distance of a metre, or 39 inches, in one minute of time,—and that they called one unit of chemical action; and, comparing the amount of combination of the chlorine and hydrogen to form hydrochloric acid, which was found to take place, with many results, established the relations I shall presently detail between the light-energy in various parts of the world. The fraction of the sun's rays being calculated, it follows that the whole amount of light emanating from the sun can be found. If allowed to shine upon the instrument directly, the action would be too rapid, and the instrument shattered.

I now quote Dr. Roscoe's pamphlet almost *verbatim*, although I condense the matter of his report:—

The day chosen for experiment must be cloudless, and the observations continued from sunrise to sunset.

It would appear that the actinic power increases in inverse proportion to the column of air through which the sun's rays have to pass. In other words, the light-energy increases from the time the sun clears the horizon until it has attained its meridian height, and afterwards decreases in something like the same ratio, so that there are two periods in each day when, all things being equal, the same chemical action is observed.

"The rays, in passing through the air, are extinguished or absorbed as light; and as the sun rises above the horizon, the column of air being lessened through which the solar rays have to pass, more of the direct rays reach the earth."

The law by which this absorption of rays obtains can be deduced experimentally, and therefore, if the action of the sun at any given height is known, its action at any other height can be calculated.

This calculation being made, agrees very remarkably with the results of observation. I cannot reproduce, *verbatim*, Dr. Roscoe's tables, but I may be permitted to relate the general issue of his experiments conducted at Melville Island, Rejkiavik (in Iceland), Heidelberg, St. Petersburg, Naples, Manchester, Cairo.

These experiments gave the light-action in four forms, viz:—

1. The action of direct sunlight in degrees of light.
2. The same of diffuse daylight in degrees of light.
3. The same of total light in degrees of daylight.
4. The action of total lights in light-metres.

In the latter, it was found that the total chemical action effected by the solar rays, from sunrise to sunset, at the vernal equinox, was—

Melville Island	1306
Rejkiavik	2324
Petersburg	2806
Manchester	3625
Heidelberg	4136
Naples	5226
Cairo	6437

or five times as great in round numbers at Cairo as at Melville Island, and probably would be found even greater in situations nearer the equator.

I had hoped to have been able, with the kind assistance of your President, to have exhibited to you the action of the prismatic spectrum, obtained by passing a ray of light from the poles of a Grove's battery through a prism, upon a surface of sensitive paper, or upon a wet collodion plate. You would then have had ocular proof of the intensity of action exhibited by the various rays. As it is, I must simply state, as above, that it will be found greatest at the violet end of the spectrum, and least at the red.

Now, Gentlemen, it is impossible to overrate the importance of investigations like these. To the casual observer they present a few bubbles of gas rising to the surface of a fluid—a column of mercury rising or falling the fraction of an inch—a surface of paper more or less discoloured. To the deeper thinker—to the more profound inquirer—they afford an insight into those agencies by which the Great Creator is pleased to regulate and control what we see around us in His creation. In fact, we recognize in light one of

> ......"the vast magazine of means
> Form'd at His word, and ready at His will."

It is difficult to say where the action of light really ends. The succession of the seasons, the growth of plants, as also the distribution of those cognate groupings which constitute the flora and fauna of countries, all have a relation, and that a direct one, both positively and negatively, with this influence; and last, not least, the physical state of mankind, and no small part of what we call Hygiene, depends directly upon it. Is it going too far to say that his moral nature is likewise in some respects under its influence? Certain it is that the human race becomes deteriorated in proportion as physical laws are neglected or perverted; and it is very hard to determine at what precise point one influence ends, and another begins. Do not misunderstand me in this.

The nature of the influence which light exerts in a substance, either nascent, in a state of change,or so loosely aggregated that a change may be effected in it, being molecular, leads me to say a word upon the etiolation of plants.

Plants, it is well known, when grown in the dark, do *not* develope the qualities and proximate principles which belong to them as members of natural orders, but are found bleached, watery, and devoid of colouring matter, or chlorophyll. What is this but the absence of that chemical force by which molecular aggregation is regulated? It matters not whether it be the blue ray or the yellow which is concerned in the agency; it is clear that an action is absent in the one case which is present in the other. Combinations of carbon and water are found, indeed, *without* light; but *with* it are developed those more complex arrangements which are deservedly called "organic," inasmuch as they are generated by the stimulus and under the direct control of vitality. So that it is not jumping to a conclusion, but deducing, as a necessary consequence, from the foregoing reasoning, that there is a relation, and that a very intimate one, between light and vitality, either as cause and effect, or at all events, as an accessory fact.

To such a point have these researches been pushed, that MM. Bunsen and Roscoe, not content with measuring the actinic force in various parts of the earth, have been actually enabled to apply that measurement (roughly estimated indeed, but still approximately true) to the relative chemical power of light in the various planets forming part of our solar system. Admitting its immense influence upon the organic life developed in this terrestrial globe, and admitting some analogy to exist between members of a system where harmony, order, and coordinate relation appear transcendent, is it presumptuous, and is it wholly unprofitable, to speculate upon the states and conditions of other orbs which have this community of light-influence, superadded to the universally-prevailing law of gravitation?

True, such speculations can never wholly be verified. Still, whatever enables us to make large generalizations, by establishing relations between the scattered members of a vast group, elevates the mind of man, and, raising him far above the things of time and space, gives him a faint perception, and that the only one he can hope for in his mortal condition, of the tremendous questions of Infinity and Eternity.

At the conclusion of Mr. Wheeler's paper, the President described the mode in which paper was prepared for photometric purposes, explaining the difficulty which attended it, and the precaution necessary.

A vote of thanks was cordially tendered to Mr. Wheeler.

Mr. Melhuish then exhibited some magnificent photographs of Rome; also a particularly interesting series of stereoscopic Sicilian views, lately photographed by Mr. Napper.

The meeting then adjourned.

Photography in its relation to the Fine Arts.

By A. Claudet, Esq., F.R.S.

[Photographic Society of Scotland.]

Having had the honour of being invited to become a member of the Photographic Society of Scotland by my friend Mr. Ross, the Vice-President, I have gladly consented to have my name balloted for the election, without con-

sidering the distance, which will prevent me from attending the meetings and being a useful and active member. This invitation, couched in the most flattering words, was for me a proof that my incessant labours in the field of photography since its discovery were considered as having contributed to its progress as an art and to its investigation as a science. How could I not be sensible to such a compliment?

I felt also a great satisfaction in seeing my name associated with some distinguished members of the Society, who, from the earliest days of photography, full of admiration for the new discovery, of which they foresaw the future greatness, having found in me a no less enthusiastic adept in the art than themselves, came to me with the result of their attempts and observations, fortunate when, from my daily practice, and with the resources of a complete establishment, I was enabled to communicate to them some useful information. This agreeable and disinterested intercourse has given rise to feelings of friendship, to which I attach great value, and which I hope long to cultivate.

I shall therefore not be a complete stranger in the Society; and I am glad to belong to it, not only on that account, but because it is the centre of photography in a most interesting country, as much renowned for the intelligence, learning, and genius of its hardy race, as for the romantic scenery of its land.

In Scotland the art of Photography has already attained the highest state of perfection. This has been proved by the annual exhibitions of the Society, in which from time to time have been gathered splendid specimens of the various styles of the art, representing landscapes, ancient and modern architecture, and celebrated ruins, all belonging to the country. Scotch photographers need not, indeed, look very far to exercise their art; they possess at home rich and abundant subjects for their pictures; they have simply to select, and the choice is the only embarrassing difficulty. Is not that advantage capable of developing in their minds the most fervent taste for artistic pursuits, and elevating in their hands the art of photography?

Every country must necessarily impart to the art a peculiar merit of its own—a kind of superiority stamped by the character of local features, and by a certain individual mode of feeling. For this reason, Scotland is called to occupy a conspicuous position in the art, and, under the guidance of its spirited and influential Society, to be prominent among the various schools of photography.

The Photographic Society of Scotland, with such a number of expert native members, comprises all the requisite elements of success. However, if it admit a stranger into its ranks, this imposes on him the duty of acknowledging the honour he has received by endeavouring to contribute to the interest of the meetings, sending from time to time some communication capable of promoting, as much as it is in his power, the advancement of the art.

In my wish to begin the fulfilment of that duty, I experience the difficulty of finding a subject of sufficient interest not relating to any particular point of practical investigation. Not that I am entirely unprepared to offer the result of researches on some such investigations; but I must reserve this kind of communication for a less formal occasion, when I shall have finally assumed the garb of labour, and have taken my place of companionship among the active members of the Society.

For the present, perhaps, it will not be found inappropriate if I undertake the task of treating of photography in its relation to the fine arts, to show the services it is destined to render to artists, the influence which it will exercise upon the public taste, and the advantages it has conferred on the community.

When we consider the present state of photography, the vast improvements which have been made during the last few years in its chemical manipulation and in the construction of the instruments employed, it seems that we can hardly wish to have a more perfect process. The highly sensitive preparation which enables photographers to fix the image of the rolling waves of the sea, and the optical apparatus which represents objects on a large field in the most perfect definition and form, are results which would have appeared difficult to obtain only a few years ago. Therefore, supposing that the process should remain as it is, we have a new art in great perfection, capable of producing works of the most exquisite kind, provided it be conducted by the refined judgment and skilful hands of real artists.

Let us, then, for one moment leave the process, its manipulation and instruments, and consider photography as a new branch of the fine arts. We shall endeavour to show that, as such, it requires the most strenuous efforts of mind, and a true appreciation of the ideal beauties of nature, to manage it with entire success, and to make it yield all the sentiment of the picturesque that the fine arts have had the exclusive privilege of creating by imitation.

In photography the difficulty is, not to produce a good picture, but to know when we have obtained one really worth keeping. The most successful photographer is the one who, constantly at work, is never satisfied with his productions, and who, having taken many pic-

tures, will efface the greater number, very often the whole of them. This is the only condition of success; for he will begin and begin again, with perseverance, until he has obtained irreproachable results.

The first care is to select a fine subject or scene; the next, to find the best point of view from which it is to be taken, and the hour of the day at which it is the most favourably lighted, whether from the east or from the west. When a spot has been selected, the photographer should not leave it until, after repeated attempts under the most propitious circumstances, he has succeeded in obtaining a picture realizing all the poetry of nature.

In nature a landscape does not always present the same aspect. According to the season, the weather, the position and height of the sun, and the transparency of the atmosphere, or a sky more or less loaded with various kinds of clouds or vapours, the landscape gains or loses all its beauty, and that which will be splendid when lighted by the morning or evening sun may appear very indifferent in the middle of the day, or when the sky is overclouded. Is it not owing to these changes of effects that travellers differ so much in their judgment of the same localities? To appreciate all this, requires not a mechanical photographer, but an artist photographer endowed with the quickest powers of perception and the greatest taste. He must take the effects as they are actually produced; for, unlike the painter, he has no means subsequently to modify, improve, and correct his picture by colour, or by light and shade during the progress of the work.

For this reason the artist photographer must seize his subject precisely at the right moment: and too often he waits in vain; or if in despair he makes an attempt, he is doomed to be disappointed with the result. He may, indeed, have obtained a perfect photograph, but he will generally find it deficient in the artistic character he was aiming at. This is the photographer who understands his art and his duty. If at last, after repeated attempts during a long tour, he can bring home at the end of the season only half a dozen splendid negatives, he may indeed be perfectly satisfied and delighted at his success. For what more can he want, to appear with great honour at the next Photographic Exhibition?

Is not this enough to prove that photography is really an art, in which, as in any other art, only genius and talent can rise to a high position, and, consequently, that the number of its masters cannot but be very limited? In fact, how few are deserving that name among those whose productions have been seen at the various exhibitions during the last five years in England, France, and elsewhere! In that immense number of photographs, showing good manipulation, and the work of perfect instruments, what a small number are really to be called artistic pictures, and such as one would like to place in one's portfolio!

However, this is not to be regretted; such difficulties are precisely the most powerful incitement and cause of emulation, without which no man of talent can be induced to work at photography; for there can be no pleasure or merit to do what costs neither trouble, thought, nor labour.

It has often been said that photography will have the injurious effect of deterring many from devoting their talents to the cultivation of the fine arts, because it is feared that the public, being supplied with cheap and innumerable photographic productions, will be no longer in want of the more expensive works of the artists. Such a fear is entirely unfounded, and may be called ridiculous. The fine arts spring from the mind only; they do more than copy nature—they transform, embellish, create, by the power of æsthetic aspiration and intellectual conception. They are to photography what poetry is to rhetoric. Photography cannot take their place. It was given only to poetical art to produce such works as a Venus of Medicis or a Virgin of Correggio. There were no such models in nature. Still one is the representation of all that is pure, graceful, lovely, soft, and harmonious in form; and the other brings to our contemplation what is beautiful, chaste, holy, and inspired in mind. The poetical art has a power which does not belong to photography; one creates, the other copies.

If the productions of photography are seen everywhere, and are found in the hands of every one, this will form the judgment, spread among all classes the taste and love of the beautiful, and make us understand better the works of those who, before photography, by their talent and genius alone, could imitate nature,—and of those who, since its discovery, without despising the hints which it offers so abundantly, will continue to devote their skill to create original compositions. Therefore photography will increase the taste for all the productions of art; and, reciprocally, art will be beneficial to photography.

When, in future ages, our successors shall visit the galleries of paintings and compare the various styles of the old schools, they will inevitably be struck by a general character in the design, and a certain mode in the treatment, indicating exactly the time at which photography made its appearance, and exercised its influence upon the fine arts.

As we distinguish the Raphaelite era, posterity will mark the photographic period, showing that art, far from having degenerated and lost anything of its originality and perfection, has been considerably improved by it. How could it be otherwise? Is not photography the mirror of nature? and when the painter has to imitate nature, what can be more profitable to him than to consult that unerring mirror in which truth is so minutely delineated, drawing so perfect, and perspective so correct? Photography is nothing but the image of natural objects as they are depicted on our retina: and if that image is only transitory, still it is capable of leaving in gifted minds an impression susceptible of being continually recalled by the power of memory.

When we examine the works of the great masters, we are so much struck with the correctness of their composition, that we cannot conceive how they could have been executed without some photographic representation. And has not this been really the case? If they did not employ the camera obscura, because it was not invented, did they not make use of the most delicate and sensitive photographic tablet, the retina, upon which has been momentarily delineated the very image they have copied? Therefore, strictly speaking, the fine arts have never been independent of what is equivalent to photography, although it was only for the very few, endowed with the most delicate senses of memory, perception, and imitation.

But those artists would not have been less eminent had they been helped by the real works of photography, affording still less unerring means of copying nature. Photography is to the fine arts what logarithms are to mathematics. Certainly since that invention there have not been less able and less profound mathematicians than before, the only difference being, that by their means work has been easier, more rapid and productive, and less subject to error. Photography is for the artist a vocabulary which guides him in his translation of the language of nature, a sketch-book in which he always finds fresh ideas and new inspirations.

While endeavouring to demonstrate the incontestable merit and advantage of photography, to show its beneficial influence in the progress of the fine arts, we are naturally led to the conclusion that it has been invented precisely because the fine arts were in want of its assistance.

Why and how has photography been invented? The story is as simple as it is instructive; and in relating it, we shall remind the artistic world that the discovery has been its own creation, and the result of its most thoughtful and earnest inspirations.

Men of science had long ago tried to ascertain the action of light upon certain chemical compounds. This had for object only a philosophical purpose, having no decided import on artistic applications, but merely intended to serve science. However, these first experiments were sufficient to prove that light had the property of producing visible changes in the colour or constitution of certain substances; and the knowledge of this fact awakened the attention of artists, who, being in the habit of using the camera obscura, could not help wishing that the beautiful image they had before their eyes, and which they were copying with so much trouble, could only fix itself permanently on its screen by the power of its light, so that they might keep it for use when wanted.

Wedgwood was one of the first who availed himself of the facts disclosed by former scientific investigations. He obtained an image by the action of light, but his chemical surface remaining sensitive, continued to be affected in the other parts if exposed again to the same action of light, consequently his image could only be preserved in the dark, and was of no use for artistic purposes.

Nièpce was more fortunate. He found that certain bituminous substances on being affected by light were decomposed, and in that state were capable of being easily dissolved; so that after having exposed in the camera obscura a surface coated with such substances, all the parts having received the action of light could be dissolved and removed by a washing, leaving the surface like an engraved plate. This was a most important result: the image was visible and permanent; and, besides, by inking the plate by the usual printing process, slight impressions could be obtained on paper.

However, Nièpce's discovery was not susceptible of a general and practical application, because the effect of the camera obscura, being very slow, required an excessively long exposure to the most intense light.

Now we come to the labours of Daguerre and Talbot, and we have to record the real discovery of photography, one of the most extraordinary events of an age remarkable for the greatest triumphs of science and intellect.

By a curious coincidence, the two discoveries of Daguerre and Talbot, completely differing in their character, were made simultaneously in France and in England, and published to the world almost in the same week; and, more singularly still, they presented a similar and most peculiar feature, which was at once the stamp of the genius of the inventors, and the indispensable condition of their success.

Both Daguerre and Talbot, like their predecessors, had found some substances readily affected by light, yet not to a degree sufficient to bring out the image of the camera obscura in a reasonable time. There ordinary minds would have terminated their researches; but genius never stops, its resources are inexhaustible, and nothing escapes the power of its reasoning. They argued in this way: if the light of the camera obscura has not been intense enough to complete the chemical transmutation and produce its impression, the sensitive surface must have received the beginning of an action, which, from this latent state, might be susceptible of being continued by the application of other chemical agents, until rendered perfectly visible. Such was the grand idea which led to the marvellous discovery of the Daguerreotype and of the Talbotype. It is easier to imagine than to describe the innumerable difficulties the inventors had to go through in their researches and experiments; it is enough to say that Daguerre and Talbot succeeded in bringing out the latent images of their respective processes, *one by the action of mercury, and the other by that of gallic acid.*

It is always a new source of wonder and admiration to behold in the Talbotype an image suddenly brought out by the application of a transparent liquid upon a white sheet of paper, and in the Daguerreotype by the invisible vapour of mercury in which the bright metallic plate is suspended.

The Daguerreotype has been improved by the use of chloride and bromide of iodine in the preparation of the plates, which process I communicated to the Royal Society the 10th of June, 1841, in presenting the first almost instantaneous pictures produced. M. Fizeau, who also, in France, had indicated the accelerating power of bromine, made the beautiful discovery of fixing the delicate bloom forming the Daguerreotype image by a thin coating of gold precipitated from a mixed solution of chloride of gold and hyposulphite of soda, thereby rendering it permanent and susceptible of being coloured.

The Talbotype, distinguished by the peculiarity that an unlimited number of images can be printed from a negative impression of light, has also been improved, first by M. Nièpce de St. Victor, who substituted for the paper a film of albumen spread on glass, considerably more transparent and perfect, and subsequently by the late Scott Archer, a most ingenious, deserving, and honest man, who died unremunerated for his splendid invention, and whose unprovided family is now waiting for the gratitude and sympathy of the photographic world*. Archer, instead of albumen, coated the glass with a film of collodion, which, by a peculiarity of its chemical constitution, added a considerable degree of sensitiveness to the preparation. From that moment Mr. Talbot's process became almost instantaneous.

These are certainly important improvements, but they have not changed the original principles and character of the two inventions. Therefore Daguerre and Talbot indisputably will be for ever called the fathers of photography.

Now we must remind the artistic world that Daguerre and Talbot were led to the discovery of photography because they were both artists, and in want of photography. Their genius induced them to think that they could find in the stores of science the means of fixing the image of the camera obscura; and they set to work with the most persevering efforts.

Daguerre was a professional painter of some reputation, and renowned for his part of the invention of the Diorama, the idea of which belongs to him and to another eminent artist, named Bouton. Daguerre was in the habit of making his dioramic sketches by the help of the camera obscura, which enabled him to produce more correct representations of the natural scenes which he wanted to copy. While using his camera, he was continually thinking how his labour would be facilitated if he could once for all have the image fixed on its screen, and be able to copy it at his leisure. This constant wish led him to the discovery which bears his name.

Mr. H. Fox Talbot, an independent gentleman endowed with the most ingenious and scientific turn of mind, was in the habit, as an amateur artist, of taking sketches during his travels, and while employing also the camera obscura for this purpose, recollected what had been done by chemists in their researches upon the effect of light on various substances, and, in his wish to serve his artistic attempts, was induced to try to fix the image of his camera by means of some chemical action. He succeeded at last, and made the discovery which, in his enthusiasm for its *beautiful* result, he called *calotype*, and to which afterwards his name was given by the same feeling of gratitude which had been evinced in favour of Daguerre. In justice, the name of Talbotype ought to be continued as well as that of Daguerreotype, because, without Talbot, photography on paper would not exist. Why

* A subscription in favour of Archer's family has been opened, under the generous auspices of the Queen, at the suggestion of the Photographic Society of London; and it is to be hoped that no photographer deriving profit or pleasure from Archer's discovery will refuse to contribute to the welfare of his family.

should that justice be refused during his lifetime to a great man, a benefactor to his age? Is it always to be left only to posterity to remunerate meritorious deeds?

If photography has been invented because the fine arts were in want of it, would it not be ridiculous to think that they can be injured by it in any way, when we see all artists of talent gradually availing themselves of the advantages of photography, and taking their inspirations even from its most indifferent productions?

It is particularly in miniature portrait-painting that photography is called to exercise the most beneficial influence; and already a complete revolution has taken place in this branch of the fine arts.

It may be said that no miniature portraits are now taken without the help of photography. Even eminent artists turn their talent to painting or copying photographs, which has the advantage of giving them the most correct likenesses without obliging the person to sit tediously before them during often-repeated and long visits. The whole of the figure and draperies, with the most elaborate details of dress, can be painted without the model, who is required only for a short sitting, indispensable to catch the expression and colour of the face. The result evidently is more correct and satisfactory, the labour of the artist is considerably simpler, and consequently, the price being more moderate, the demand for portraits has increased to a degree which could never have been imagined before. In fact the demand is so great that there is comparatively a great scarcity of artists: they are all fully and advantageously occupied; and there is room for a greater number than can be found, merely for the wants of photographic establishments.

Therefore photography, instead of injuring the interests of artists, is the greatest boon which could have been wished for by them. But it was feared that photography would be an impediment to the development of rare talents, possessed by such as those who have been distinguished by the refinement and taste of their inimitable productions, and by the happy fidelity of resemblance, united to the expression and mind they imparted to their likenesses. Those talents will have more opportunities than before to rise to eminence, because, among the immense number of artists engaged in the easier task of painting photographs, there will be many who, being born with true genius, will acquire in that occupation the discernment of the beauties of nature, the knowledge of drawing (so perfect in photography), and the taste for composition, so pure and elegant, which are abundantly presented in the choice works of photographers in a variety of ways.

The position of the figure, the arrangement of draperies, the selection of suitable accessories, everything constituting the composition of a picture, is not a gift belonging exclusively to the painter. A photographer of taste, feeling, and judgment, who cannot handle a brush, may yet compose the most artistic pictures, know how to place his model in the most favourable position for its figure and countenance, and to light it with all the useful contrasts of chiaroscuro, giving force, harmony, and character to the composition.

Practice and experience are efficient masters in everything. The photographer of talent has this considerable advantage over the painter,—that he composes twenty pictures every day, while the painter composes only what he can paint and finish. Therefore painters cannot fail to find in the productions of photographers the most useful models, the effect of which they can improve according to their skill and feeling; and those who have to learn their art cannot study at a better school than that of photography. I have said that photography, in its present state, leaves hardly anything to wish for its improvement. But it is evident that it requires in the operator various qualities of the most refined kind; and it is not expected that every photographer will become an artist, any more than that every person using a musical instrument will become a musician. As we are constantly liable to hear more bad than good music, so we shall always be obliged to submit to see a greater number of bad photographs than of really good ones. Photography itself is perfect; it is no more answerable for the wretched attempts of its ignorant and uneducated tyros, than music for the disagreeable sounds too often extorted from the most perfect instrument, or than the art of painting for the vile productions of the brush, which before photography, were exhibited in show-frames at the door of every dabbler in miniature portrait-painting. The removal of these frames is one of the great benefits of photography; and if they have been replaced by the innumerable frames of the photographers, promenaders have not to complain of the change: at all events, they have the advantage of recognizing their friends, and seeing the human figure represented in pretty good drawing, and in its natural proportions.

Photography is to be praised for other important considerations. It has created a new and vast industry, giving occupation to an immense number of persons. First, there are those who practise the art as a profession, and the great number of artists, assistants, clerks, and servants they employ; then come the

different branches of trade and manufacture which supply photographers with instruments, tools, utensils, optical apparatus, chemicals, glass, paper, and silver, frames, mounts, and cases.

Every photographer, professional or amateur, must have an operating-room entirely constructed with glass, like a conservatory, and supplied with blinds, curtains, carpets, furniture, &c. For this he has had to employ an architect, builder, and upholsterer. Generally these operating-rooms, for the sake of light, are placed on the top of houses, which, by making them useful, gives to upper parts of buildings a higher value than they had before.

The collodion process requires, for every picture or portrait taken, a piece of perfect glass, constituting a negative; and as those negatives must be kept in case new impressions are required, every photographer is obliged to to accumulate an immense number of them; so that, with the stock of these glasses which he wants for his daily practice, and the glass required to cover every picture, this article alone involves the outlay of a considerable capital, and its supply is for the glass manufacturers an additional source of lucrative employment and a large increase of production.

The construction of lenses required for the optical apparatus has put in requisition the skill and learning of the best opticians, who, in their efforts to supply photography with the most perfect instruments, have been obliged to investigate the laws of optics with more attention than had ever been done before. In improving photographic lenses, they have made new discoveries which have already had important applications in the construction of telescopes, opera-glasses, and microscopes.

Progress in any art or manufacture is never without producing new improvements in some other branch, or giving a useful impulse to the production of the materials required of a more suitable and more perfect kind. This has been the case with respect to the construction of photographic lenses. Opticians could not make perfect lenses without two kinds of glass, each of different density and dispersive power, which were to be always of the same degree, corresponding with the formulæ by which they had calculated and determined the various curvatures of the different parts forming a compound achromatic system. Therefore the opticians had to find some glass-manufacturers having the spirit, skill, knowledge, and capital necessary to undertake the manufacture of the important article they wanted. Besides the density and dispersive power of the two kinds of glass (one crown glass, and the other flint glass) which were required by the optician, they were both to be perfectly homogeneous, colourless, transparent, and free from striæ,—in fact, to be as pure as the clearest water. Those who visited the Great Exhibition of 1851, in London, and 1855, in Paris, know to what extent these conditions have been fulfilled in England by Messrs. Chance Brothers of Birmingham, and in France by others. So that the large consumption of optical glass for photographic purposes only has been one of the causes of considerable improvements in that article of manufacture, by which all optical instruments, from the smallest camera-lens to the largest telescope-lens, can now be obtained in the greatest perfection.

If photography has produced such advantageous results both in an artistical and mercantile point of view, it has also exercised a considerable influence in the diffusion of scientific knowledge among those who as professional or amateur photographers have necessarily been obliged to enter into the consideration of the principles of chemistry and optics, which are the base of photography. Many who had never thought of these sciences have found it indispensable to learn them, in order to become proficient in their art. Photographic Journals, which are so numerous and read by all interested in the art, are constantly treating of the most elementary and even abstruse questions of these sciences, and have become a cheap and efficient medium of instruction. Is not that also a most beneficial result? Henceforward chemistry, optics, the constitution and properties of light, will form an essential part of knowledge, and become as common as geography, grammar, and arithmetic.

Should we not also allude to the application of photography to the stereoscope—a new art in a new art? Here, again, the most difficult questions, of binocular vision and its phenomena, the investigation of which some years ago was a subject fit only for the consideration of a small number of profound philosophers, are now, if not so easily understood, at all events studied by every one. For this the world is indebted to photography and to the stereoscope—the beautiful discovery of Wheatstone, illustrating the causes of the relief and the distinction of distances of natural objects, and explaining the laws of binocular vision.

This discovery, although a most splendid deduction of philosophic inquiries, seemed at first to be a fact only applicable to the study of the physiology of vision; and the inventor himself could never have dreamed of the valuable application and effective illustration his discovery was to receive from another subsequent and unexpected discovery still more marvellous—that of photography.

In the future records of scientific discoveries, it will, perhaps, be difficult to hold that the stereoscope was invented before photography. It might be thought more natural that photography should have suggested the stereoscope, which would infallibly have happened by the mere accident of squinting when looking at two photographic pictures taken at the same moment by two cameras. By the act of squinting, each picture being represented in the centre of one retina, in the same manner as when we converge the optical axes upon natural objects, the visual coalescence would have taken place, inevitably producing the curious phenomenon of flat pictures raised in perfect relief.

While some writers would assert that photography was the father of stereoscopy, others might as plausibly argue that the stereoscope had suggested the idea of fixing the images of the camera obscura—the only means of illustrating its principles.

That such confusion might arise in the history of the two discoveries would be less surprising than the fact, that not only they were made independently of one another, but that they should have remained ten years without being practically and generally connected, although, when they were both well understood, it could not have escaped many philosophers that photography was the most perfect means of producing the two identical pictures of different perspectives required for the stereoscope, and that the stereoscope was to receive from photography its most valuable application. Wheatstone, indeed, was the first to avail himself of the earliest attempts of photography to obtain pictures for his stereoscope; and I had myself the pleasure of supplying him, at his request, with daguerreotype pictures for this purpose as early as the year 1842.

But for a long time the daguerreotype was the only process generally employed in photography; and these kinds of pictures, on account of the reflexion of the metallic surface, could not well be examined except in a certain inclination, and were unfit for a conveniently close examination in an instrument admitting light in all directions.

This induced another eminent philosopher to turn his attention to the subject; and it was only in 1849 that Sir David Brewster read before the British Association at Birmingham a paper on the application of the stereoscope to photography; and he presented to the meeting a very ingenious instrument, which he called a semilenticular stereoscope, particularly adapted to examine the daguerreotype pictures, and which had the advantage of magnifying the images. From that moment photographers turned their attention to the application of photography to the stereoscope; and that instrument, a most popular and inexhaustible source of enjoyment, is now found in every household, from the palace of Royalty to the humblest cottage in every country.

The stereoscope is the general panorama of the world. It brings to us in the cheapest and most portable form, not only the picture, but the model, in a tangible shape, of all that exists in the various countries of the globe; it introduces us to scenes known only from the imperfect relations of travellers; it leads us before the ruins of antique architecture, illustrating the historical records of former and lost civilizations, the genius, taste, and power of past ages, with which we have become as familiarized as if we had visited them. By our fireside we have the advantage of examining them, without being exposed to the fatigue, privation, and risks of the daring and enterprising artists who, for our gratification and instruction, have traversed lands and seas, crossed rivers and valleys, ascended rocks and mountains with their heavy and cumbrous photographic baggage. These artists, in penetrating to the most remote scenes of the world, are constantly surprising the simple and ignorant natives, and, by initiating them in the marvels of our science and knowledge, are infusing in them the wish of becoming acquainted with our civilization and sharing its advantages.

We cannot think that photography is spreading knowledge and civilization, increasing our enjoyments, procuring lucrative occupations, and promoting science, art, and manufacture, without asking, what is the cause of such wonderful results?

It is that inexhaustible emanation of the sun, the source of animal and vegetable life, by which the elements exercise one upon another the various actions producing all the beautiful phenomena of nature.

It is light which not only has created these wonders, but which renders them visible to our senses,—by which we are able to admire the immense blue sky; the clouds brilliantly white or resplendent with the richest hues, moving in the most fantastic and majestic forms; the ceaselessly rolling waves of the sea; the land with its mountains and valleys, lakes and rivers, with its forests, meadows, and fields. It is light which enables us to contemplate all the works of God—so magnificent, so perfect, so varied; to wonder at the endless diversity of plants and living creatures; and to recreate our eyes by the sight of the graceful and sweet flowers, shining with their thou-

sand harmonious colours. It is light, our greatest source of enjoyment and happiness—light, which is the second creation of the world.

Lux est mundi lumen.

On Focusing with View Lenses.

To the Editor of the Photographic Journal.

Jersey, April 9, 1860.

SIR,—A few words on focusing will complete all that I have to say respecting the Panoramic Lens.

Let us first consider the use of focusing with an ordinary view-lens. I find on careful experiment that a lens 10 inch focus, with a $\frac{1}{4}$-inch stop, will give an equally good focus in the centre of the picture to all objects which lie between a distance of 40 feet from the lens, and an infinite distance from it. The space between 40 feet and infinity is therefore the "depth of focus" of the lens; that is to say, 4 feet to the inch of focal length, with a stop the $\frac{1}{40}$th part of the focal length.

This being settled, we come to the questions of curvature of the image, flatness of the plate, and nearness of foreground objects. I find that if the lens is focused for the extreme distance, that is, brought to its minimum distance from the ground glass, it gives the foreground objects at the bottom of the picture in sufficiently good focus.

The practical result of this is, that, if I fix the lens rigidly at its principal focal distance for the ground glass, I get the foreground sharp, as well as all objects in the centre which lie within its focal depth. At the same time, possibly good definition will be got of objects at the sides of the picture and above the horizontal line.

It is evident therefore that, with the lens so focused, I may go about taking ordinary views for years without ever requiring to alter it. It is only when an object is placed nearer than 40 feet, in the centre of the picture, that the focus would require to be altered; but that could not be done without throwing the whole of the other objects out of focus, and spoiling the picture.

It can easily be proved that the law which I have stated, viz. 4 feet depth of focus to an inch of focal length, is applicable to all view-lenses, when the size of the stop bears the same ratio to the focal length. For instance: a lens of 20 inches focus, with a $\frac{1}{2}$-inch stop, has a depth of focus extending from 80 feet distance to infinity; and a panoramic lens 7 inch focus, with a stop $\frac{7}{40}$ths of an inch, has a depth of focus extending from 28 feet to infinity, and so on,—the shorter the focus of the lens, the greater being its depth of focus; so that panoramic lenses have a greater depth of focus than ordinary view-lenses covering the same area of picture.

The practical conclusions are as follows:—

1st. That view-lenses of short focus, such as 10 inches, do not require the photographer to focus for every view he takes. He will find it a more suitable and convenient plan to make a mark upon the lens-tube, and keep the lens always fixed at that mark. He will find that he can work all his life in that way, and never require to alter the focus of his lens when taking ordinary views.

2nd. That focusing is not required in the panoramic lens. By making the radius of the cylinder equal to the principal focal length of the lens, all ordinary views can be taken, with the same freedom from the necessity for focusing which is allowable in ordinary small view-lenses.

If any one doubts the truth of these remarks, let him make a mark upon the tube of his lens corresponding to the focus for distant objects, and, after he has carefully focused any ordinary view, let him observe how far the mark is from its former place. He will find that, in all ordinary cases, the lens will remain at the same mark.

Short-focus lenses have greatly the advantage of long-focus ones as regards "depth of focus." Greater depth of focus is also gained by using a smaller stop. I have an astronomical telescope 76 inch focus and $4\frac{1}{8}$ inch aperture, which, when directed towards terrestrial objects, has *no* depth of focus, and you might nearly estimate the distance of any object by measuring the focal length of the object-glass when directed towards it. But in this case the real image formed in space is seen, magnified by the eyepiece; which is not the case in a photographic lens. Not only is the focus much shorter, and the stop smaller, but the real image is received upon a collodion film, and viewed by the naked eye.

THOMAS SUTTON.

The Collodion Report.

To the Editor of the Photographic Journal.

Middlesex Hospital, May 28th, 1860.

SIR,—Allow me through your Journal to reply to some remarks made by Mr. Malone at the last meeting of the Photographic Society. That gentleman states in general terms that the opposition to the Collodion Report comes from those intimate with collodion-makers, so that consequently the criticism on that Report "must be interested." Having been one of those who criticised the Report as strongly as any one, I beg, in my own name and in that of

the Blackheath Society, which adopted my criticism, to state that, even supposing we were capable of being actuated by the unworthy motive attributed to us by Mr. Malone, we were kept out of all temptation, as not one of us is so much as acquainted, far less intimate, with any maker of collodion. It is, perhaps, hardly necessary for me to say that, if the neighbouring Society spoken of by Mr. Malone be (as I have no doubt) the Blackheath, no such assertion as he attributes to us was ever made: we neither said nor meant to imply that the London Society did not know what it was about. A published document, emanating not from that Society, but from a small section of it, was criticised; but it was never asserted, even of the authors of that document, that they did not know what they were about; far less was such an assertion made of the Society in general, which has not even now adopted the recommendations of that document.

While thus recklessly imputing motives to those who differ from him, Mr. Malone tells us that he deprecates personalities, and adds that he speaks as he does because he has no possible interest at stake. He seems to forget that, a few minutes before, he stated that all criticism coming from those intimate with makers of collodion *must be interested*. Without wishing to endorse such an opinion, I would ask, is Mr. Malone not intimate with Mr. Hardwich? CHAS. HEISCH.

[With reference to the adoption of the Report of the Collodion Committee by the Photographic Society, we are informed by one of our Vice-Presidents that it is not usual to propose a Report of that kind for general adoption: it is simply received and entered upon the minutes. —ED.]

The Archer Fund.

June 11, 1860.

Sir W. J. Newton requests that the following subscription may be inserted in the next Journal:—viz. Arthur Green, Esq., £2 2*s*.

The Treasurers have now in their hands the sum of £49 10*s*. 4*d*., and would beg to urge the exertions of many persons who have been benefited by the discovery of the late Mr. Archer.

A Season Ticket has been forwarded to every Exhibitor who has contributed his photographs to the present beautiful Exhibition at the Crystal Palace; and we are sorry to have occasion to notice some sad attempts to encroach on the liberality of the Company: in one instance, an exhibitor, who had contributed a single specimen of photography to the Society's Exhibition in Pall Mall, afterwards purchased three other specimens of professional photographers, and sent them as the productions of his relatives, asking for three additional admissions for members of his family.

CORRESPONDENCE.

All communications for the 'Journal,' and or business relating to the Photographic Society, may be addressed to the Secretary and Editor at Messrs. Taylor and Francis's, Red Lion Court, Fleet Street, E.C.

The Rooms lately occupied by the Society at No. 1 New Coventry Street, W., are now entirely closed.

A Correspondent writes to us, requesting that a caution should be given to operators answering advertisements, and details a case in which he seems to have been very unfairly treated. He says, "I am thoroughly convinced that many advertisements are only put forth as a trap to catch some first-class operators, and after availing themselves of their experience, they are discharged with sundry excuses, tantamount to nothing;" and adds, "I think it would be a great boon to professional and other photographers if some of the respectable firms of London would keep a register of parties wanted and wanting situations."

J. H. S.—If the bath is slightly acid, the paper will keep its colour longer after being sensitized: acetic acid should be used.

J. W. (*Hewton*).—We believe that Mr. Pouncey, Dorchester, can give you the information. The print issued, we think, has always been considered as a "carbon lithograph."

J. Y. D.—If you take the back lens away from your portrait lens, and screw the front lens in its place, you will probably succeed, unless the focus is too long. You had better consult some optician whose opinion is of acknowledged value.

Economy.—Although you can reduce the salts of silver to the metallic state, you will find it more satisfactory to take the refuse you have to a refiner. Messrs. Buckland, of the Hop Gardens, St. Martin's Lane, we know, have conducted such operations at a very trivial expense.

J. W. (*Stamford Hill*).—Mr. Archer first published his collodion process in the 'Chemist,' in the spring of 1851.

Cornish Chough.—Will you kindly forward your address, which has been mislaid?

Mico-Photo.—Canada balsam is said to dry much harder if it has been kept some time. It may be procured at an optician's, or at Apothecaries' Hall.

Amateur (*N. B.*).—We have never seen a negative on paper developed by gallic acid fade, and many hundreds have come under our observation. If exposed in damp weather for the purpose of printing, they occasionally become injured, by small particles of the silver salts detaching from the prepared positive paper, which blackens by the action of light, and consequently produces a number of small white spots in any after positive taken from such negative.

We are sorry to postpone Mr. Walter Hardie's communication, with illustrations, until our next Number; but it would have been very unsatisfactory to have divided Mr. Claudet's valuable paper.

ERRATUM.

Page 233, col. 2, line 11, *for* fond *read* bound.

Letters of inquiry to the Editor can be answered only through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 99. JULY 16, 1860.

PHOTOGRAPHY AND THE VOLUNTEERS.

The past month has been devoted to one absorbing subject—to one topic of paramount interest, before which all other cares and pursuits have had to bend submissively. The Volunteer Movement that began amid the mistrust and ridicule of those too busy to think seriously on a new question, and of those too idle to think about anything at all, had, by the opening of the spring, mastered the good-will of all classes, shown itself worthy to be ranked amongst the permanent institutions of the country, and aroused the respectful and anxious attention of Foreign Powers. With the summer another change came. Rifle Corps had proved themselves popular, in the best sense of the word, by their long rolls of efficient members drawn from every honest class of the community. They were now to become fashionable. It was understood that the Queen would, on some bright day picked out of the very heart of the season, review her new troops—her unpaid army, and let them show Europe and all the world that Freedom has no evil to fear, but every good to hope, from her own children. The intelligence was not without its influence in those quarters of town where the wealthy and noble have their abodes. The supercilious smile that shortly before had rewarded the supercilious sneer at Rifle-Corps' glory disappeared. Proud and high-born beauties no longer hesitated to declare themselves partisans in the cause of amateur soldiering. And the fair critics and rulers of our ball-rooms were countenanced in their generous advocacy by veteran and thoughtful soldiers who have proved in many battles and divers climes the stuff of which good armies are composed.

It was not, however, till the last month that the Volunteer furor reached its height. The preparations for the coming review stimulated the ardour of the enrolled and the curiosity of the unenrolled. In all directions the prevailing excitement manifested itself. Company drill, position drill, and rifle-practice formed the staple of conversation in the clubs. At every dinner-party there was sure to be at least one man just up from Hythe, and able to give the latest intelligence of how things were going on at the School of Musketry. Business-talk acquired a military smack. Physicians paid hurried visits to rich valetudinarians, excusing their haste on the plea that they were off to drill; even Death being compelled to moderate his paces out of respect to the new "idea," just as disease, real as well as imaginary, has in many cases been driven routed from the field by the increased physical exertion which the "new idea" necessitates. In the Committee-rooms of the House of Commons the same tone asserted itself; and in the Law-courts of Westminster and Chancery Lane, in Judges' Chambers, and at learned conferences, *les enfans perdus*, clad as to their nether extremities in "regulation grey," certainly have not affected exemption from the dominant sentiment.

In a month when all other questions of ordinary interest have sunk into comparative insignificance, it could neither be expected nor wished that photography should be uninfluenced by the surrounding agitation. The gentlemen who for years past have most attracted public attention as photographers have not been slow to shoulder the rifle, and learn, by practice rather than by the precepts of Mr. Hans Busk, how to use it. The nation has doubtless gained, but it is equally certain also that Art has lost. Patriotism has of late, like Law, been a jealous mistress, demanding the undivided attentions of her suitors, and rejecting with disdain the

addresses of unenthusiastic worshipers. Mr. Dillwyn Llewelyn has (only for a time, even as patriots, we hope) left his first love. Solicitude for his corps has triumphed over his devotion to photography. For months past he has been engaged in producing "distant effects;" the paper used in the operations, however, not being prepared in a solution of some chloride, but saturated with an unctuous compound of beef and mutton fat, that not long since formed a convenient pretext for the amiable extravagances of our Oriental compatriots. In the same way, one of the most efficient of our metropolitan corps has so effectually taken possession, body and soul, of Mr. B. V. Turner, that it is now some months since we have been favoured with any work from his right hand—once skilful with the camera, but now ambitious only to be skilful with the trigger. A voice, too, is heard from far distant Caledonia, directed to Mr. Horatio Ross, and all who may have weight with him. "Why," pathetically inquires the Photographic Society of Scotland (already bereft, by Volunteer ardour, of their Honorary Secretary, Mr. C. G. H. Kinnear), "why has our Vice-President so long deserted us? Has the triumph of his son—that magnificent succession of rare shots at Wimbledon, and the concluding ovation at Sydenham—excluded from the father's proud heart all memory of old friendships?" Surely Mr. Ross will respond to this appeal in a manner that shall set it beyond all doubt that he still regards the beauteous face of Nature as fit for something else than a table to be shot across—that he can still use nitrate of silver to as good purpose as charcoal and saltpetre. We do not reproach those gentlemen for their temporary desertion. We appreciate only too highly the generous impulse that has seduced them from us. All we say is, let them return, and once more take their places in our school. They shall not be treated as truants, but greeted as heroes fresh from fields of glory. We will congratulate them on all they have done during their absence, and no sigh or word of repining shall remind them of the days we spent in loneliness, watching for their coming back. We will even enter into a pact not to taunt them with their shortcomings by pointing with undue frequency to the superior merits of Captain Roger Fenton, who has discovered how to be at the same time a Captain amongst Riflemen and a Captain among Photographers—at once a perfect soldier and a consummate artist.

Lord Bury has told the public, through the current Number of 'Fraser,' in his very excellent article on "The Volunteer Course at the Hythe School of Musketry," how the Volunteers congregated at Hythe in the month of last May were anxiously awaiting the arrival of "Mr. Fenton, of Crimean celebrity, Volunteer and Photographer." Mr. Cobb, the enterprising chemist of Hythe, had done his best to satisfy the growing demand for Rifle-corps photography. That gentleman's masterpiece of "Colonel Luard, Colonel Jones, and Major Nelson, inspectors of Volunteers, convivially seated at a table with one glass (empty) between them," had been extensively circulated and sold. But still, something more was expected, and, at the time Lord Bury was at Hythe, riflemen were asking each other when there was a chance of Captain Fenton making his appearance with his powerful lenses and polished glasses. The Volunteers were not disappointed. In due course a gentleman of a martial aspect and an imposing length of limb and beard, clad in the uniform of the London University Corps, and encumbered with the semi-landsurveying wholly diabolical apparatus familiar to photographers, came upon the scene and announced himself as the "chiel" ready to "tak' notes" and "prent 'em," on a system unsurpassed for veracity. These "notes," and those subsequently taken at Wimbledon, when presented to the public, will constitute a series of photographic scenes which few Volunteers will like to be without. Of the eighteen photographs of this series which we have already had the pleasure of examining, five were taken at Hythe and thirteen at Wimbledon. Let us take the Hythe lot first. No. 1 represents the gallant artist himself in the uniform of his corps, standing on the steps of the "D Division of Officers' Quarters,"—his stalwart frame resting against the stone-work of the entrance, and accepting from it support that seems little needed; his right hand resting on his hip, and his left grasping the top of his Enfield barrel. The attitude of the gentleman is a very good specimen of what may be termed the "stand-at-ease-stand-easy-order-arms-do-as-you-like" position; and the countenance—expressive of interest in certain military evolutions supposed to be going on in the distance—is certainly not otherwise than in keeping with the soldier-like bearing of the entire figure. No. 2 gives us an admirable likeness of Captain Horatio Ross, kneeling, and aiming at a bull's-eye some hundreds of yards distant from his own. No. 3, General Hay, kneeling, at nine hundred yards. No. 4, the Right Wing, Volunteer Course. This picture contains more than half a hundred military figures, with a dense knot of spectators in the distance. No. 5 is a very picturesque bit of drill-scene; a cosy villa skirted by birch and luxuriant shrubs in the background, and in the foreground twelve

Riflemen, well grouped, watchful, and business-like.

The Wimbledon *thirteen*, which will probably interest a wider public than the Hythe ones, are not less felicitous in execution. No. 1. The Queen's Rifle lying in state, loaded and securely fixed, like a good soldier waiting to do the bidding of its mistress. No. 2. The Target, pierced in its inmost centre by Her Majesty's well-directed ball. No. 3. The Royal Tent, from beneath which the good rifle was fired, with the elegant pavilion erected for Her Majesty's reception, showing its white canvas in the background. No. 4. Her Majesty in the act of firing the rifle: an excellent photograph,—the whole scene steeped in sunlight, the tents far away, like the royal awning, shining bright as burnished silver, and the dense mass of spectators coming out freshly and vividly. No. 5. The front view and interior of the Duchess of Cambridge's tent, with its precious treasure of the great silver cup, guarded by two constables in the regulation police dress—a costume certainly not in harmony with the rest of the scene. No. 6. The Queen receiving the Address. No. 7. Another view of the Queen's retiring pavilion. No. 8. Whitworth trying the range of the Queen's Rifle,—a very good photograph. No. 9. Shooting for the prize given by the Duke of Cambridge. Nos. 10 and 11 are both representations of "The shooting for the Queen's Prize." Abounding in interesting portraits, these two photographs have claims on attention, apart from their high artistic merits. No. 12. Shooting off ties—all comers. No. 13. A line of carriages: a bright brisk picture, with a sort of Derby-day smartness, both in the arrangement of "the line" and in the whole effect of the piece. It will afford a pleasant souvenir to all who took part in the glorious 7th of July, which has left on the minds of thousands a regard very nearly approaching affection for the peaceful village of Wimbledon.

In connexion with the above triumphs of Volunteer photography, we can also inform our readers, and we do so with no ordinary pleasure, that several Volunteer regiments have already made arrangements to have the portraits of some of their members perpetuated. Amongst others, the semblance of the Duke of Manchester's famous Mounted Corps, and the Huntingdonshire Mounted Rifles, that created so memorable a sensation in Hyde Park on the occasion of the review, will be preserved to posterity by the agency of the camera. If the durability of photographs be only as great as we would fain believe, the children of the present generation of Riflemen will value highly the results of this new movement of art. What would we not give for similar memorials of George the Third's volunteers? But they have gone, leaving scarcely a trace behind them. *Carent vate sacro*, which for the present occasion must be rendered, "they couldn't get photographers for love or money."

The Total Eclipse of the Sun.

Our Vice-President, Mr. Vignoles, has published, for the advantage of the public, and especially of photographers, "Observations to accompany the Shadow-path thrown by the Total Eclipse of the Sun on the 18th July, 1860, across the North-eastern part of Spain;" and we are informed that Mr. Warren De la Rue and an accomplished staff of photographers have departed for the Peninsula to endeavour to record, by the aid of the camera, the phenomena exhibited. The Spanish Government have aided in the cause of science, and Don Xavier e Isturiz has addressed a letter to Lord John Russell, informing him that all sorts of philosophical instruments, including "*photographic apparatus*," will be allowed to be brought into the country free of duty, provided they are again taken away by those who bring them for their own use.

Mr. Vignoles's observations will be read with interest; he gives a description of the beautiful map which accompanies his work, and explains fully all the various markings thereon, describes all the different routes which travellers may take, and says,—

"The interest which so remarkable a phenomenon as a total eclipse of the sun must create in the breast of the philosopher, and indeed of all enlightened persons, will probably attract to Spain not only astronomers, but some at least of the travelling class of society, who seek in the summer months a relaxation from the toils of business.

"The Spanish Government, with great liberality, have officially announced their intention of affording every facility to observers; and the British and American Governments will depute their most distinguished astronomers. France also, always a leader on such occasions, is making preparations to a more than usual extent to send observers.

"Spain is a country so little known, and, from the impressions left of former disturbances and want of safety, is viewed with such distrust by too many persons, that it will only be doing justice to the Government and to the people to make known as widely as possible that, except in the want of some of those comforts which Englishmen appreciate rather too sensitively, the whole range of country shadowed by the eclipse may be visited in the

most perfect security with no great difficulty, and with much satisfaction—always provided that the visitor be not too much pressed for time.

"To the mere traveller the country offers a variety of novel attractions: to the soldier, the geologist, or the engineer, as well as to the astronomer, objects of great interest will meet him at every step. On the western side of the country the shadow will pass over all those scenes of the Peninsular War, which have been so graphically described by Napier and other military writers. The numerous railways partly executed, but mostly in course of construction, have laid bare the curious strata in the spurs of the Cantabrian Pyrenees and other mountain-ranges, offering objects of geological interest, curiosity, and novelty, rarely to be met with; and to those who are little aware what progress Spain is making in internal improvements, it will be a matter of great satisfaction to note that numerous lines of railway are gradually but rapidly extending over the country. Generally, it may be said that a new pleasure is proffered to those who travel, not simply for the purpose of hurrying from town to town, but to observe at leisure, and with satisfaction, a rare and interesting astronomical phenomenon, and a country of which the peculiar features and inhabitants are well worthy of study.

"Fortunately for the taste or inclination, and especially the time of different classes of persons, the shadow of the eclipse is so wide, that points may be chosen within an easy distance of decent quarters, and without an absolute necessity of ascending to the highest peaks, which, except in a few instances, would be a matter of considerable difficulty and inconvenience. There are numerous elevated points, from 2000 to 3000 feet in elevation, from which the wonderful phenomenon may be observed to the greatest advantage, besides those specially pointed out.

"At almost all the towns on the high-roads, reasonable accommodation is to be found for travellers not too fastidious; and more especially at the inns (*Paradors*) where the diligences change horses. At Vitoria, the Hotel Palliares is perhaps the best in Spain; but at St. Sebastian, particularly at the Parador de las Postas, at Tolosa, and at Bergara, there are very decent inns. At Pamplona the inns where the diligences stop are the best. At Tafalla there is a very comfortable inn, at the extreme north end of the town; and very good accommodation at Tudela, at the hotel nearest the bridge. At Logroño and Haro the accommodation is not bad; and at all these places eligible night-quarters may be procured; indeed, in almost every part of the country a good clean bed may be obtained at every small inn.

"Spain, however, still continues, even in the large towns, what Ford calls '*a larder-less country*,' and the traveller will do well to provide himself, before he leaves his hostelry in the morning, with some of the 'provend' so much insisted upon by that experienced traveller in Spain; and the Englishman should take care not only to carry his tea, but his tea-pot and tea-kettle. But even at the best places people have to wait a terribly long time for their meals, unless ordered some hours beforehand.

"Those visiting Spain with the express intention of making astronomical or physical observations, would probably find it more convenient to go by steam to Santander or Bilbáo; for although both the Spanish and French Governments have proffered every facility in the way of exemption from Custom-house examination of such articles and instruments as can be identified purely for scientific purposes, yet the trouble and difficulty, to say nothing of the expense of land-carriage through France, would be productive of great inconvenience and probable delay."

Mr. Vignoles gives the following, from the 'Popular Astronomy,' on the phenomena presented during a total eclipse:—

"The spectacle presented during a total eclipse is always most imposing. The darkness is sometimes so intense as to render the brighter stars and planets visible. A sudden fall of temperature is sensible in the air. Vegetables and animals comport themselves as they are wont to do after sunset. Flowers close, and birds go to roost. Nevertheless the darkness is different from the natural nocturnal darkness, and is attended with a certain indescribable unearthly light, which throws upon surrounding objects a faint hue, sometimes reddish, and sometimes cadaverously green.

"Many interesting narratives have been published by scientific observers who have been so fortunate as to witness these phenomena.

"Immediately after the commencement of the total obscuration, red protuberances, resembling flames, appear to issue from the edge of the moon's disc. These appearances, which were first noticed by Vassenius, on the occasion of the total solar eclipse which was visible at Göttenberg on the 3rd of May, 1733, have been re-observed on the occurrence of every total solar eclipse which has taken place since that time, and constitute one of the most curious and interesting effects attending this class of phenomena.

"A total eclipse of the sun took place on the 28th of July, 1851, which became a subject of systematic observation by the most eminent astronomers of the present day. A considerable number of English observers, aided by several foreigners, distributed themselves in parties at different points along the path of the shadow, so that the chances of the impediments that might arise from unfavourable conditions of the atmosphere might be diminished. The reports and drawings of these various observers have been collected by the Royal Astronomical Society, and published in their Transactions.

"It appears to be agreed generally among astronomers that the red emanations above described are solar, and not lunar. If they be admitted then to be solar, it is scarcely possible to imagine them to be solid matter, notwithstanding the apparent constancy of their form in the brief interval during which at any one time they are visible, for the entire duration of their visibility has never yet been so much as four minutes. To admit the possibility of their being solar mountains projecting above the luminous atmosphere surrounding the sun, and rising to the height, in the exterior and non-luminous atmosphere forming the corona, necessary to explain their appearance, we must suppose their height to amount to nearly a twentieth part of the sun's diameter, that is, to 44,000 miles.

"The fact that they are gaseous and not solid matter appears, therefore, to be conclusively established by their enormous magnitude, the great height above the surface of the sun at which they are placed, their faint degree of illumination, and the circumstances of their being sometimes detached at their base from the visible limb of the sun. These circumstances render it probable that these remarkable appearances are produced by cloudy masses of extreme tenuity, supported, and probably produced in an extensive spherical shell of non-luminous gaseous matter, surrounding and rising above the luminous surface of the sun to a great altitude."

In an appendix he adds, from the Memoirs of the Astronomical Society, the observations on a former total eclipse, made by Professor Airy, Mr. Dunkin, Professor Piazzi Smyth, Robert Snow, Robert Stephenson, and other eminent astronomers, concluding with instructions for observation of the eclipse by the Astronomer Royal.

Mr. Vignoles's labours in the cause of scientific observation will be thankfully received, and his pages perused with much interest by all who have made celestial photography their pursuit.

By way of gossip, we may tell our readers that we have heard that Mr. Robinson of Leamington has been occupied for a long time in the composition of a large picture copy of living figures, combined with a landscape from nature, which is to be exhibited at the next Photographic Exhibition, and we are led to believe that it far surpasses anything of a similar kind of photographic picture which has hitherto been produced.

Card-portraits.—These little portraits, conveying to the beholder the most perfect idea of the individuals represented, have lately been so much sought after that we are creditably informed that, on the occasion of the Meeting at the commencement of the Dramatic College, nearly three thousand were sold, or ordered by those present. It is to be regretted that the series issued by some of our best photographers should contain portraits that a gentleman of quiet tastes would rather not be associated with, and that these are represented to be the most remunerative to the artist.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

THE Twenty-fifth Ordinary Meeting of this Society was held June 18, 1860, at the Golf Club House, Blackheath; the President, CHARLES HEISCH, F.C.S., in the Chair.

The minutes of the last meeting having been read and confirmed, the Secretary reported the issue of a conference of the Committee appointed to meet the delegates of the Greenwich Natural History Club and the West Kent Microscopical Society, to promote the holding a *soirée* during the present season, and stated that the Committees had recommended the postponement of the plan *sine die*, owing to the difficulty which existed of finding suitable rooms for the purpose.

It was moved and seconded that the Report

of the Committee be confirmed, which was carried unanimously.

The question of a medal voted to the Golf Club in recognition of their liberality to the Photographic Society was then discussed, and letters read from the Secretary of the Golf Club accepting the Society's offer.

Mr. Glaisher then proceeded to read a paper by Mr. Paul Pretsch, on a new process for "Photographic pictures reproduced by the ordinary letter-press (surface-printing)," which he prefaced by some remarks of his own, to the following effect:—

"Rapid and continuous as have been the discoveries connected with photography, and important as some of its applications have become, I think the one I am about to mention is as wonderful as any, and promises to be of the utmost importance. When the invention of M. Daguerre was made known, we all recollect the hopeful feeling that occupied our minds, that the wonderful results thus produced by nature should by human skill become permanent and not fleeting. Since the invention of photography it has become an elegant and highly useful art; it has stimulated inquiry and experiment in the improvement of its processes and in the endeavour to give fixity to its productions; but, as Mr. Pretsch says, these are, he fears, still perishable.

"It is now some years since Mr. Pretsch mentioned to me the hope that photography would be made subservient to the quick reproduction of photographic originals, and I know that at different times he has made many experiments; but it was a bold idea, and one which scarcely seemed possible to be realized, viz. to obtain by means of photography a block from which to print with ordinary printers' ink on the ordinary letter-press (viz. surface-printing). The first specimen thus obtained I had the honour of submitting to you some months ago; and now I have several specimens, all of them absolutely untouched by the graver, and showing a great advance in the process."

The author commences by observing, that if the words of an eloquent speaker are capable of moving the wills and actions of thousands, the same words will act upon the minds of hundreds of thousands if *printed*.

In his (Mr. Paul Pretsch's) new process, now brought before this Society, is the first solution of the problem. By its means we can effect, by publishing *authentic* illustrations of events, or of works of nature and art, just what has already been accomplished for the spread of thought by printing.

We consider it a bold idea, to produce, from a photographic original, by means of photography, a block, to be printed with ordinary printers' ink on the ordinary letter-press (surface-printing). But there are now the first specimens before you—all of them absolutely untouched by the graver. The inventor begun with the most difficult portion of the process, with the reproduction of photographic originals, because there are no lines or markings, but only tints in the original, which must be reproduced in a certain solid substance to print from. Therefore it appears that the reproduction of drawings or prints in lines is a somewhat easier and a more grateful task, because the method by which the required effect ought to be produced already exists. Although he (Mr. Paul Pretsch) had had the idea many years in his mind, and although he had made numerous experiments at different times, still he had solved the problem only during the last year; consequently the invention has been matured and executed in England.

The main advantages of surface-printing by the ordinary letter-press, are rapidity and cheapness of production. If the number of copies from an engraved plate be thousands, from a block several hundreds of thousands may be produced; if the price of a print from an engraving be a few shillings up to several pounds, we are accustomed to pay for the productions of the letter-press in pence; and the time required for printing is about in the proportion of 1 to 20, and in some instances of 1 to 50 and more.

In comparison with his former process, consisting in the production of an engraved copper plate for the intaglio printing press, the inventor states that the production of blocks is cheaper, and requires less time. For an intaglio printing plate he requires—after having obtained his mould in gutta percha—the electrotyping of the copper matrix (about three or five days), and of the solid printing plate itself (about ten days or a fortnight); but the production of a block for the letter-press, after having obtained his mould, can be done in twenty-four hours, and, if required, in less time, because the copper deposit for this purpose can be made rapidly, and needs to be only thin, being backed up with type metal, and fixed on a block of wood, like these specimens. The expenses for electrotyping are consequently in the proportion of about 1 to 3, or 1 to 5, according to circumstances.

Both processes of Mr. Paul Pretsch, for intaglio and for surface printing, have one and the same object. It is obvious that he uses the influence of light only for the production of the *first printing plate or block*; and having obtained this, he is enabled to print therefrom with mathematical certainty, by mere mechanical means, any number of copies required.

Photography alone cannot do this; it requires the influence of light to produce each single copy; and even the various carbon and ink processes, though perhaps more durable than silver prints, are obliged to have light for the production of the copies required.

Both processes possess the advantage that their copies are printed with ordinary printers' ink; and though the inventor is quite sure that his first process of producing engraved copper plates for intaglio printing will yet come into use, and that the time will come when it will be applied for the production of first-rate prints, still, considering that surface-printing combines with the same fidelity of reproduction so many important advantages, we may presume that surface-printing cannot supersede intaglio printing, but that it will take its due place by the side of intaglio printing; the demand for blocks, however, may greatly surpass the demand for intaglio printing plates.

The proposition was submitted to you in February last, and there are now the first specimens. It appears that the author has fulfilled his promise, *to make Photography subservient to the Printing Press*!

The President, Mr. Heisch, then introduced some photographs of fluorescent substances kindly sent him by Dr. Gladstone, expressing his regret to the Meeting that he was obliged to quit, which prevented his personally describing them, but he would leave them in the hands of Mr. Wheeler for explanation.

Mr. Wheeler claimed the indulgence of members for any shortcomings he might exhibit in dealing with the subject at so short a notice. He said, members were doubtless aware that, independently of the colours exhibited by the prismatic spectrum to ordinary vision, there existed to some extent throughout the spectrum, but at and beyond the violet end of it chiefly, invisible rays, termed extra-spectral. Stokes had discovered that the bluish opalescent appearance manifested by a solution of quinine when viewed in particular lights, and also the opalescent appearance of glass coloured yellow by oxide of uranium, were due to the fact that these bodies had the property of reflecting, and at the same time so altering the refrangibility of these rays, as to bring them within the range of human vision. Substances having this property have been named *fluorescent*. When viewed by ordinary light, these bodies exhibit little or no peculiarity of appearance, owing to the number of ordinary luminous rays reflected equally from them and surrounding bodies; but if illuminated by light that has passed through a violet-coloured glass (which contains few of the more luminous rays of the spectrum, but the whole of the invisible rays, owing to their property of so altering the refrangibility of these rays as to render them visible), they appear, in comparison with the ordinary bodies around them, to be almost self-luminous. Other lights, containing few of the more luminous and many of the invisible rays, may be used to exhibit these phenomena; and on the present occasion Mr. Wheeler employed the light from sulphur burned in oxygen gas, when characters traced on writing-paper with various substances, which by ordinary light were scarcely visible, became beautifully luminous.

Other bodies which possessed the power, besides quinine salts and uranium glass, had been since discovered; those sent by Dr. Gladstone being sulphate of quinine, sulpho-stilbate of baryta, comenate of potash, esculine (the active principle of horse-chestnut), and chlorophyll.

Mr. Wheeler then proceeded to remark that the chemical action of the spectrum was greatest at that part which contains most of these invisible rays. Without going so far as to assert that these rays are actually the *chemical rays*, it had occurred to Dr. Gladstone that the alteration of their refrangibility might also deprive them of their chemical action. Experiment proved the conjecture to be right, photographs of the fluorescent characters being undistinguishable from those of characters in ink. This was particularly evident in the photograph of some letters cut out in white paper soaked in the fluorescent bodies and pasted on a paper coloured blue by cobalt; in the photograph the letters appeared black on a white ground. These experiments are very interesting to the photographer, as establishing another link between the chemical and Stokes's rays.

Mr. Wheeler concluded by stating that he was glad to have the opportunity of extending the subject he had partially unfolded to them at the last meeting of the Society, viz. the phenomena of light.

Mr. John Harding proposed a vote of thanks to Mr. Wheeler for his impromptu discourse, which was seconded and carried, and the meeting adjourned until October.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

ANNIVERSARY MEETING AND SOIRÉE.

The above was held on the 21st inst. in the National School Rooms, Shaftesbury Street, Walworth. The members and visitors assembled at an early hour. The large room was very gaily and tastefully decorated with banners, flags, shields, and wreaths of evergreens; enlivened with variegated flowers, festooned

from the rich oaken beams, and drooping in graceful pendants from the walls. The tables, running longitudinally down the sides and centre of the room, were covered with pink, and draped with white muslin, looped up here and there with leaves and flowers, and were crowded with a mass of interesting and amusing objects. A table as bountifully spread with refreshments for the body as the others were for the mind, stood in generous rivalry by its neighbours, showing that the Committee had not forgotten the former in their earnest desire to cater for the latter.

The President (the Rev. F. F. Statham, B.A., F.G.S.) opened the business of the evening with a few appropriate remarks on the importance of photography, not only to the arts and sciences, but to all who were bound by ties of affection to those whom it might please Divine Providence to remove from them, inasmuch as it enabled us to retain one of the most pleasing mementos possible to conceive of the absent or deceased. He, on this ground, claimed for it the special love and encouragement of the fair sex, whom he was very pleased to see so well represented upon this occasion; concluding by adding, that "he trusted they would all feel that this Society was deserving of encouragement, and would do all in their power to induce their friends to become members of it."

Mr. Wall then read the Report for the past year, as follows:—

FIRST ANNUAL REPORT OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

In obedience to Rule 9, your Committee proceed to lay before you this, their first Annual Report.

The present aspect of the Society is decidedly promising, and we may congratulate ourselves on the apparent surety of its foundation. Our members are not large in number, but we have a very fair share of vitality, and contrive to be active in our proceedings. The meetings have been tolerably well attended, but we regret that several members, whose election raised sanguine hopes, and whose names won us public respect, have not yet "put in an appearance" on our behalf; still we console ourselves with the credit of contriving to do so well without them, and the earnest hope that we may do better *with them* in the next session.

The South London Photographic Society sprang into existence on the evening of May 10th, 1859, at a meeting convened by public notice, and by your present Secretary; which was attended by Messrs. G. Shadbolt, W. Ackland, F. Howard, A. Hervé, and J. C. Leake. A Provisional Committee was formed for the proper organization of the Society, and the first public meeting was held on the 9th of the following July.

The papers read at our monthly meetings were as follow:—

Truth in Art illustrated by Photography. By H. L. Keens, sen.

Practical Hints upon Positive Printing. By J. C. Leake, jun.

The Difficulties of the Dry Processes. By W. Ackland, Vice-President.

Observations on Photographs in their relation to Art. Contributed by your Secretary.

On recent Improvements in Photographic Apparatus. By W. Clarke.

Failures in the Wet Process, their Cause and Cure. By J. C. Leake, jun.

The Iron Printing Process. By M. Hanaford.

On Amateur Photography. By Frank Howard.

On certain Experiments with the Salts of Silver. By T. Clarke.

On the Application of Photography to Scientific Pursuits. By the Rev. F. F. Statham, B.A., F.G.S., President.

Photographic Jottings.

The discussions, we are happy to add, have been numerous and animated, eliciting much useful information.

Your Committee take this opportunity for throwing out the few hints following, for the consideration of members.

It has been suggested that the formation of a permanent Committee, for the special purpose of testing and reporting upon the value of such improvements in processes, experiments, &c. as may be found in the various journals, would tend to point out their real value, so that they might be at once either adopted or discarded. A fund (*in the event of our increased prosperity*) might be placed at the disposal of such a Committee for the incidental expenses; and at each meeting we should have a something certain to look forward to from our "Experiment Committee."

A complete collection of the literature of photography, periodical and otherwise, English and Continental, to circulate among the members, is also a very desirable object of attainment, which our increased funds would enable us to secure.

A collection of first-class photographs might be added to the folio for the year, by the formation of a club, of which each member paid some trifling monthly subscription, and had in turn the privilege of naming the subject for purchase. The specimens so procured to be divided and become the property of the

members at the close of each year. Any members willing to aid in carrying out this suggestion will please to give in their names to the Secretary.

While the practical is made, as it deserves to be, a most prominent feature in our papers and discussions, your Committee would suggest that theoretical and philosophical questions should by no means be neglected; "purblind practice" will sometimes

"Every theoretic truth disdain,
And blunder on mechanically vain;"

but, *as a Society*, while we should not be characterized by a puffed-out pride in the mere act of languidly hoarding up embryo knowledge, we should beware of separating elements of theory and practice, which are so essential for the production of a perfect whole. Your Committee would also urge upon members the advisability of making arrangements which will enable the Secretary to announce at one meeting the subject of the paper for the next. The representatives of this or that branch of special knowledge more directly pertaining to the subject to be discussed, will then be more likely to attend, and thus improve and give increased effect to the discussions which it is so desirable should take place upon such occasions; for it must be remembered that photography has brought into harmonious relationship a number of apparently conflicting, or, at least, opposite elements, in *all* of which it is indeed seldom that we find any one or even two individuals tolerably proficient; and it might possibly happen that, from neglect of the method recommended and hitherto adopted, no gentleman was present at the reading of such paper competent to tender any observations, and thus the labour so generously undertaken in our favour might fail to meet an encouraging reception and adequate reward.

Your Committee are also desirous of discouraging the habit of permitting discussion to degenerate into the low tone of ordinary conversation. If each speaker addresses, not only his more immediate neighbour, but *the whole of the meeting*, you will easily perceive that his personal views or opinions will have the better chance of being strengthened, improved, or refuted; which, as *the advancement of the art, and not the individual*, is the great purpose of our organization, is, of course, especially desirable. Some may, from a fear of those awful beings, the reporters, hesitate to adopt our suggestion; but we can assure them that, while the pith of all remarks worthy that honour will afterwards be found in print, the mere chaff of words, which they themselves do not, indeed cannot, pause to separate from the wheat of sense, will, if only for the credit of the pages in which they appear, never be recorded against them. These remarks, of course, do not apply to conversation unconnected with the subject under discussion. There are many other such hints as the preceding, which might be urged upon your attention; but we will not detain you any longer with them upon this pleasant occasion.

To take a passing glance at the more prominent photographic features of the year will not demand many minutes. No great events, no very wonderful inventions have characterized the past twelve months of our Society's existence. Steady progress in the practical departments, quiet advance towards the artistic, have been its most praiseworthy traits.

Bottled light, which opened with a pop, and effervesced noisily all over Europe, seems again likely to be corked down. The alkaline gold-toning bath has stolen into more general use and appreciation. The construction of lenses, or their combinations, has developed nothing novel, excepting a lens of an original character (Mr. Sutton's panoramic), which, together with its camera and other apparatus, was exhibited at one of our meetings, and which seems to offer great advantages in a largely increased angle of view, &c. Much, too, has been done in the way of reproduction during the year. We were delighted to find the educational authorities at Kensington had resolved to carry into the very humblest homes of the land we live in, that refining and ennobling influence which belongs to all real art, by making photography an instrument for the faithful reproduction of such costly works of the greatest painters as have hitherto been inaccessible, and beyond the means of even the wealthiest among us. Many have, however, been looking vainly and impatiently forward to the delivery of these copies, and begin to fear that some members of the "Barnacle" family may have stepped in with their "how-not-to-do-it" system. When we consider that, aided by the camera, copies of these glorious productions can be scattered by thousands among the people, at a cost purely nominal, and that to produce one such without photography's aid would require the best talent of our greatest painter, at a cost of perhaps thousands, or at least hundreds of pounds, the importance of this step must, we are sure, be acknowledged with no little gratitude and pleasure.

Many productions of high artistic merit have been published during the year, which are especially gratifying, as proofs that the almost latent pictorial power of our art is beginning to be discovered and more generally appreciated. We may take praise to ourselves, also, Gentlemen, for having been one of the few—

very few—Societies which, during the year, have given due attention to the principles of art in connexion with photography, and denounced the more common and prominent offence against good taste and pictorial beauty.

One other subject, which we approach with some reluctance, remains to be noticed, viz. the Collodion Committee. It has, indirectly, done us good, perhaps; but it was certainly strange to find a body of highly talented gentlemen testing *collodions* with only *one collodion*, and solemnly and laboriously making a show of comparing, *with nothing to compare with*. Without referring to the invidious and ungrateful nature of their task, in attempting to discover the best manufacturer, instead of the best way of manufacturing, their report reminds us of some one who (under Government, of course) had nothing to do, and—with a great deal of help, and plenty of time—contrived somehow to do it. But still, let us thank the gentlemen forming the Collodion Committee for their good intentions, remembering that mistakes will occur, although it is not always policy to admit their existence.

In conclusion, we beg leave to suggest that the number in committee be increased from six to eight; that the hour of our usual monthly meeting be altered from eight to half-past seven; that as some of our members receive, in addition to that which has been chosen as the special organ of this Society, the Journal pertaining to them as members of kindred associations, and do not require the two, the yearly subscription be reduced to those gentlemen, and others similarly situated, from 10*s*. 6*d*. to 5*s*. 6*d*., and that they receive for this sum the print, and all other privileges of membership, excepting only the fortnightly Journal.

The Treasurer will now read his Report, after which we will, if you please, revive, or re-create, our newly-defunct body of officers, which done, the President will be glad to receive the names of any gentlemen desirous of being nominated for election as members.

The privilege which has been granted to the members of the Walworth Literary and Scientific Institution will cease with the past year, as we have found the subscription paid less than the outlay incurred. The circulation of the Journal is stopped until the Treasurer forwards to the publishers the names of members for the coming year whose subscriptions have been paid.

For the next three months our Society will only exist in the open air, "roving abroad like a bird or a bee," and like the latter, we hope, treasuring honey for the coming winter meetings. We meet for the first time "out o' doors" on the third Saturday in July, at half-past two p.m., at the Eagle, Snaresbrook.

Mr. Howard, the Treasurer, read the balance sheet, from which it appeared that there was a balance in hand of £1 0*s*. 1*d*. There were, however, the quarter's current expenses still to be met; but with the subscriptions remaining unpaid, and the amount in hand, this would be covered. We understand that all those members whose subscriptions are not at once handed in, will be deprived from participating in the immediate benefits of the Society.

The following officers were re-elected for the ensuing year:—The President, Vice-President, Secretary, and Treasurer.

The following were chosen the Committee:—Messrs. Hannaford, Hervé, Leake, Martin, Cotton, Fitch, Simpson, and W. Clarke.

The following new members were elected:—Messrs. Salked, Kay, Bayley, Blanchard, Bunker, Neeld, Smith, Tate, Hooper, Young, Moule, Squire, Evans, Brookes, and Bouchard.

The following gentlemen were also elected as honorary members on the motion of the Secretary, who thought the Society should not fail to do honour to itself in expressing its high sense of the services done by these gentlemen to photography, in advancing it in its scientific, practical, or artistic departments:—T. F. Hardwich, Esq., O. G. Rejlander, Esq., A. Claudet, Esq., W. Crookes, Esq., R. Hunt, Esq., and Lake Price, Esq.

Among the objects exhibited were the following:—Coloured specimens of the Alabastrine process, by G. W. Simpson. Stereoscopes, microscopes, and various scientific novelties, by Messrs. Horne and Thornthwaite. Photographs coloured in oil, &c., by Messrs. Cotton and Wall. Portable camera, by Messrs. Shepherd and Co. Leake's dark tent for out-door work, new pocket camera, and other apparatus, by Squire and Co. Photographs coloured in oil, interesting curiosities from India, stereographs and scientific instruments, by J. S. Noldwritt, Esq. A collection of curiosities, stereographs, engravings, &c., by Mr. A. H. Wall, Hon. Sec. Albums and stereograms, by G. Shadbolt, Esq. Microscopes, by Messrs. Ackland, Burr, and Garnham. Fac-similes of the Raphael drawings, by Mr. Mills, &c.

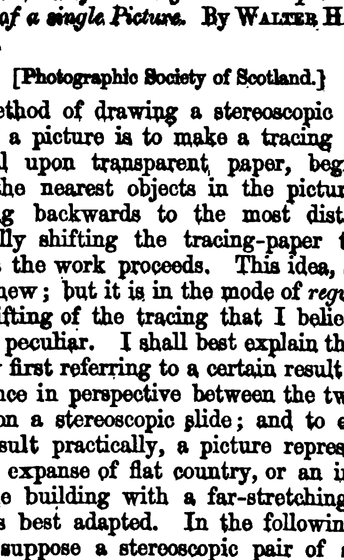
In the course of the evening the company adjourned to the lower room, where Mr. Burr, F.R.A.S., described, and exhibited in the magic lantern, a series of photographs of lunar scenery. Mr. T. Clarke then exhibited in the lantern a number of photographic views; after which the company returned to the upper room, and the rest of the evening was enlivened with some excellent vocal and instrumental music: and it was whispered, *sub rosa*, that when the

more staid and quiet visitors had retired, the room would be cleared for a dance. One of the pleasant features of this remarkably pleasant and successful *soirée* was the gracefully hospitable attentions of two or three pretty children handing round the cakes and ices, and urging the acceptance of the same in their bashfully earnest and simple childish way.

On a Method of drawing a Stereoscopic Duplicate of a single Picture. By Walter Hardie, Esq.

[Photographic Society of Scotland.]

My method of drawing a stereoscopic duplicate of a picture is to make a tracing of the original upon transparent paper, beginning with the nearest objects in the picture and working backwards to the most distant,—gradually shifting the tracing-paper to one side as the work proceeds. This idea, so far, is not new; but it is in the mode of *regulating* the shifting of the tracing that I believe my plan is peculiar. I shall best explain the process by first referring to a certain result of the difference in perspective between the two pictures on a stereoscopic slide; and to exhibit this result practically, a picture representing a wide expanse of flat country, or an interior of some building with a far-stretching level floor, is best adapted. In the following diagram, suppose a stereoscopic pair of such a picture (transparent) to be superimposed,—



their horizons lying in the line h–n, and a corresponding point in the foreground of each coincident at p. In this position of the pictures it will be found that every other pair of corresponding points lying in the line d–l is also coincident. If a line be now drawn on each picture from p to corresponding vanishing-points (v, g) in their horizons, and one of the pictures be shifted laterally so that these lines cross in some other point (c), it will then be found that every pair of corresponding points lying along the horizontal line (d'–c–l') passing through that intersection, is coincident; and so on with every possible intersection of the lines p–v and p–g, up to the horizon. Upon this fact my plan of making stereoscopic duplicates is based,—the lines p–v, p–g, and d–l being used as follows:—

(For convenient reference, I shall call d–l the *distance-line*, and p–v, p–g the *difference-lines*.)

In the first place I make an outline tracing of the picture, in *black* ink, on transparent paper. This is gummed, at the sides only, upon a frame having a central flat piece or board which slides vertically behind the tracing, between those parts of the frame to which the side-edges of the tracing are fastened. This sliding-board must be *white*, and upon it is drawn a horizontal black line (the distance-line), bold enough to be visible beneath two thicknesses of the tracing-paper. The tracing ought to be fixed with its horizon parallel to this *distance-line*, and the sliding-board must have a sufficient range of vertical movement to carry the *distance-line* from the foot of the tracing to its horizon. At one side of the tracing (beyond the limit of the picture) is now drawn *one* of the *difference-lines*. The piece of tracing-paper destined for the duplicate must be an inch or more wider than the first tracing, upon which it is placed so that its edges extend on each side, where they are gummed to a separate portion of the frame, having a *horizontal* movement equal, at least, to the widest separation (v–g) between the difference-lines. Upon this upper tracing-paper the other difference-line is now drawn, and the tracing proceeds as follows:—

The difference-lines being made by the *horizontal* movement to cross opposite the lowest (nearest) part of the picture, the distance-line (which is visible through both tracings) is brought by the *vertical* movement to their intersection, and then all the points of the outline tracing crossed by the distance-line are traced, and also all perpendiculars based upon that line. This being done, the distance-line is shifted upwards—say $\frac{1}{10}$th of an inch or less,—and the duplicate tracing moved horizontally so as to make both the difference-lines intersect the distance-line in the same point. Another line of the duplicate tracing is now completed along the course of the distance-line, and all the parts are filled up that lie between its present and previous positions. These shiftings of the duplicate tracing and the distance-line are repeated between each upward step of the work, until the distance-line reaches the horizon. Those parts of the more distant objects which become covered by the tracings of the nearer ones in consequence of the shifting, are of course omitted in the duplicate; and the blanks which are occasioned by the same cause are afterwards filled up with new drawing, the nature of which will, in general, be readily suggested by the contiguous

parts of the picture. Perspective, or fore-shortened *straight* lines may be most easily duplicated by shifting the distance-line at once from the nearer to the farther ends of them (the necessary corresponding shifting of the duplicate tracing being also made); and when the positions of the two ends of a line are thus determined, they may be joined by a straight line, which of course has a different inclination from the original.

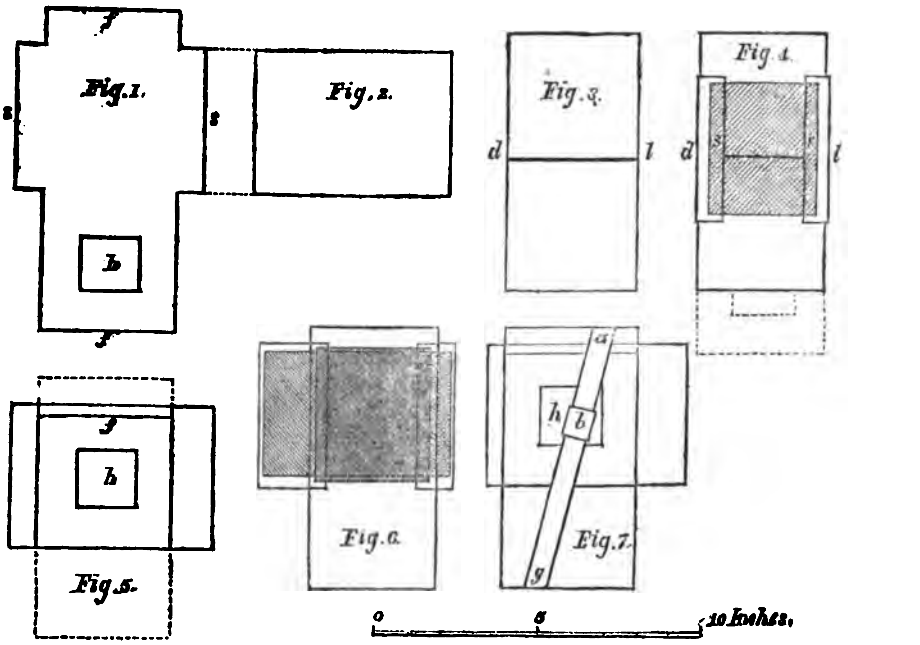
The two outline tracings thus obtained must now be shaded, in the usual way by the engraver or lithographer,—the shading being filled in upon the plate or stone, making each as faithful a copy of the original as possible. If great perfection in the shading is desired, certain differences must be made between the two copies,—as, for instance, in the amount of light supposed to be reflected to each eye from the same inclined surface, and also in the portion of the bright spot seen in polished curved surfaces.

By this plan, with care and a sufficient number of shiftings (the more numerous the better), great stereoscopic exactness may be obtained in the duplicate in all cases where the *ground* in the picture is tolerably level. For this reason it is eminently applicable to architectural subjects—street-views and interiors; and it might be usefully employed by architects and engineers to produce stereoscopic pictures of their designs, which might thus be exhibited, in the solid, on a large scale, by means of the reflecting stereoscope, or (what would perhaps be better) reduced photographic copies might be made, suitable for the common lenticular stereoscope. Where the picture represents a hilly or undulating landscape, allowance ought to be made, in tracing the duplicate, for the inequalities of the ground, the work of tracing being advanced beyond the distance-line for the heights, and delayed behind it for the hollows. Of course, to do this well requires something beyond mere mechanical skill in the draughtsman. Where the picture represents one or more plateaux at different levels, it might be convenient to use a separate distance-line for each plateau,—the height of each distance-line above the one beneath it being made equal to the height, on the picture, from base to summit, of the nearest portion of the plateau for which it is intended. In the same way, in an interior, if there is a table represented having a variety of objects upon it, these objects may best be duplicated by means of a second distance-line drawn at a height equal to that of the nearest leg of the table (as measured upon the picture) above the distance-line which serves for duplicating the floor. For elaborate ceilings, also, it is almost necessary to use an independent distance-line. This must be drawn at a height above the floor distance-line equal to the entire height of the picture if the horizon-line *bisects* it; but if the horizon-line divides the picture unequally, then the space between the two distance-lines must be made equal to twice the largest subdivision. In duplicating a ceiling, or any other *under* surface, the movement of its distance-line is the reverse of that of the floor-line, but follows the same general rule,—beginning at the nearest point and ending at the most distant. In this way pendants from a ceiling may be correctly duplicated without the trouble (which would otherwise be necessary) of finding the exact spots on the floor which are vertically under them. For all such pictures, the board which carries the distance-lines must have a range of vertical movement equal at least to the space between the two distance-lines.

It is easy to see how, by various mechanical contrivances, the two independent movements of the frame above described might be connected; so that the single act of shifting the distance-line vertically might be simultaneously accompanied by the horizontal movement, to the requisite proportional extent, of that part of the frame which carries the duplicate tracing. With such an apparatus the *difference*-lines are, of course, unnecessary. A simple and sufficiently effective machine of this sort, for duplicating small-sized pictures, may be constructed of card-board and paper in the following way:—

Cut a piece of stiff, highly-glazed paper, or vellum, of the shape shown in fig. 1, and having a hole as indicated at *h*. Cut also two pieces of stout card-board (figs. 2 and 3) with smooth, straight, and rigidly parallel sides; and across the middle of fig. 3, draw a bold black line (*d-l*) to serve as the *distance-line*. This card (fig. 3) being now laid upon the piece of paper (as in fig. 4), the two wings (*s, s*) of the latter are folded inwards so as to embrace the sides of it, and retained in position by the sides of the *first tracing* of the picture being gummed upon them. This must be carefully done, so that the card may slide easily up or down behind the tracing, without being so loosely held at the sides as to have any lateral movement. This arrangement (fig. 4) being now laid face downwards, the other card (fig. 2) is placed on the back of it at right angles to the first card, and the upper and lower flaps (*f, f*, fig. 1) are folded over it and gummed together as in fig. 5, so as to allow this card (fig. 2) an easy horizontal movement similar to the vertical movement of card fig. 3. Upon the projecting ends of this card (fig. 2), when thus

secured, the sides of the tracing-paper intended for the duplicate must now be gummed, so that this tracing-paper may be stretched smoothly over the face of the first tracing. In fig. 6 the shaded portions are intended to represent these pieces of tracing-paper. The duplicate

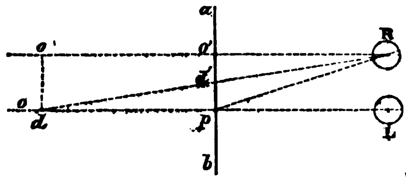


tracing-paper, of course, partakes of the horizontal movement of the card to which it is fixed. The mode of connecting this movement with the vertical movement of the card bearing the distance-line is shown in fig. 7. In this figure, *a-g* is a slip of card-board having a sliding band, *b*, of stiff glazed paper gummed round it. This slip, being placed in a sloping position as shown in the figure, is gummed *at its ends* to the back of the distance-line card; and the sliding band (*b*) is gummed to the back of the other card where it is exposed through the hole (*h*) cut in the paper for this purpose: but it must be observed that, before the slip is fastened on in this manner, the distance-line card ought to be drawn downwards, and the other card to one side, as far as possible; and the upper end of the slip should slope *towards* the side to which the horizontally moving card has been drawn. Small pieces of card-board, gummed between the ends of the slip and the card to which they are attached, make the movement easier, by preventing the slip bending in the middle over the thickness of the horizontal card.

If all the fastenings above described are secure, it will be found that the sliding up or down of the card bearing the distance-line is accompanied by the horizontal movement of the duplicate tracing-paper over the face of the original tracing,—the proportionate extent of this horizontal movement depending on the amount of slope which has been given to the slip of card-board at the back. In any more solid and permanent machine, it would be advisable that the part representing the sloping slip should be made adjustable to various degrees of obliquity, as different kinds of pictures require different amounts of stereoscopic difference. But before describing how this adjustment should be made, it is necessary to explain the manner in which the proper amount of stereoscopic difference required for any particular picture may be found.

Reverting to the diagramon page 279, it will be observed that the stereoscopic difference consists of a difference in the lateral position of the same objects in the horizons of the two pictures when a pair of corresponding points in their foregrounds are made to coincide as at *p*. Supposing *p* to represent the *nearest* object in the picture, then the line *v-g* is the measure of the greatest amount of stereoscopic difference which the pictures possess; and this stereoscopic difference is the same for *all the vanishing-points* of the pictures, whether situated in the horizon or not. Strictly speaking, *v-g* ranges, in every picture, from nothing at

the picture-surface to $2\frac{1}{2}$ inches (or the width between the eyes) at the vanishing-points; that is, supposing the picture-surface itself to constitute the *nearest object*. To illustrate this, let the following diagram represent a horizontal section through the eyes (R and L), and a pair



of picture-surfaces binocularly united at a-b. If the nearest object represented be supposed to be coincident with the picture-surface as at p, the two images of it in the stereoscope must be *actually* coincident, in order to be seen binocularly united at the true distance. In this case the optic axes converge upon the picture-surface in the directions R p, L p. Now suppose that in the left-eye picture there is a very distant object represented in the same vertical plane with p. To view this, the left eye must, of course, look in the direction L o. But as in viewing very distant objects the optic axes are virtually parallel, the representation of this object in the right-eye picture must be $2\frac{1}{2}$ inches (the width between the eyes) to the right of the representation of p in the same picture, or at o'. That is to say, the stereoscopic difference p-o requires in this case to be $2\frac{1}{2}$ inches. But in the great majority of pictures the nearest object is always supposed to lie at a considerable distance *behind* the picture-surface. Now suppose d to be the place of the nearest object represented. In this case, in order that d may be seen in its true place, its two representations (or their images in the stereoscope) must be separated to the extent of p-d'; while the images of very distant objects being separated as before by $2\frac{1}{2}$ inches, the stereoscopic difference is thus reduced to d'-o'. Now d'-o' : d-o :: R-o' : R-o; hence the rule for finding the stereoscopic difference (v-g, page 279) for any picture is to *multiply the distance of the picture-surface from the observer by $2\frac{1}{2}$ inches, and divide by the intended distance of the nearest object from the observer.* This latter distance must be estimated from the known or supposed magnitude of the nearest object represented, and the virtual distance (when viewed in the stereoscope) of the picture-surface from the observer. Thus, suppose the nearest object to be a stone or bush, or human figure (say 5 feet high), and its representation to be half an inch high; and let the intended distance of the picture-surface from the observer be 7 inches; then the distance of this object from the observer may be supposed to be 17·5 feet. The above rule applied to such a picture would give $7 \times 2\frac{1}{2} = 17\frac{1}{2}$ inches; and this divided by $17\frac{1}{2}$ feet gives 0·0833 decimal of an inch as the total stereoscopic difference requisite for the picture.

Now to adjust the machine to give this stereoscopic difference to the duplicate, the part which serves the purpose of the sloping slip a-g (fig. 7) must be fixed at an angle with the vertical lines of the picture, of which the desired stereoscopic difference is the *tangent*,—the *radius* being the vertical distance of the nearest object from the horizon. This angle may be most readily found in a table of tangents, &c.

If the picture contains a *human figure* fronting the observer, this affords a direct means of determining the required angle. In this case all that is necessary is to draw two vertical lines from the eyes of the figure, one to the horizon, and the other to the feet or base of the figure, and then a third line joining the intersection of the horizon by the first with the lower end of the second. The angle which this line makes with the others is the one required. But it must be observed that the *second* line above mentioned ought to be drawn to the proper *base* of the figure, that is, the place upon the general plan or ground of the picture which is in a vertical line with the figure. For although this is generally the spot upon which the *feet* of the figure rest, it is not always so, as the figure may be represented as standing upon an elevation, in which case the base of this elevation is the proper base of the figure. Whatever be the distance in the picture at which the figure is represented, the angle found as above will always be the same for the same picture; hence if there be more than one figure in the picture, it is indifferent which of them is selected for the purpose. When the ground of the picture is represented as on the same level with that on which the observer is supposed to stand in looking at it (which may be known by the horizon-line passing across the eyes of all figures standing on the ground), the angle for adjustment is always the same, viz. that of which the radius and tangent have the same ratio to each other that the height of a man's eyes above his feet has to the width between his eyes. This angle is about $2\frac{1}{2}$ degrees—rather less.

April 27th, 1860.

Cleaning the Plate.

By Richard Wheeler Thomas, Esq.

It is not at all an uncommon thing to hear that collodion gives spots, stains, streaks, and

sundry other cutaneous affections to which "the children of the sun" are said to be peculiarly liable; very much, however, is erroneously attributed to the collodion which more properly and with greater justice should be ascribed to want of cleanliness and method in cleaning the plate. Nothing is so simple; and although there are many ways of arriving at this very desirable end, I unhesitatingly recommend the following as most efficient, safe, and simple. Cleaning the plate is of much greater consequence than some are prepared to admit. Every photographer should make himself thoroughly acquainted with this process: much time, expense, and subsequent labour will be saved by a systematic attention to what may at first be thought sheer drudgery, and which is too often delegated to inexperienced and careless hands. I am not saying too much when I state that, in point of manipulation, cleaning the plate is the key to the whole position. I now proceed to describe, for the benefit of those who can fit up their operating-room with conveniences, the plan I adopt.

I have a shallow sink, three inches deep, lined with lead, and a pipe to convey away the waste water (the size of this sink must, of course, be regulated by the size of the plates to be cleaned); it is firmly mounted on a stand of convenient height, and securely fixed to the wall of the room; in this sink I place two blocks of deal (1½ inch stuff) a little larger than the plate, covered with thick felt strained over one side of the block and nailed to the edges all round; over this in the same manner I strain white calico; the blocks are now prepared, and present a firm but sufficiently soft surface on which to cleanse the plates; place them in the sink and wedge up tight with loose blocks. I use one of these blocks for the first operation. Place the plate to be cleaned in the centre of the block, and pour on to it a small quantity of the following mixture:—

	oz.
Prepared tripoli	2
Water	3½
Spirits of wine	4
Solution of caustic potash	0½

Take a tuft of cotton-wool and rub the plate well and firmly over with the above mixture for a minute or so; then remove the plate to block No. 2 (over this I have fixed a tap of water a few inches above the plate); turn on a gentle stream and rub off the tripoli mixture with a second tuft of cotton-wool. Keep these tufts upon their respective blocks; they are then always ready for use. Be very careful to rub the edges of the glass with the tuft, to remove particles of tripoli which become attached to the roughened edge, and which, if not removed, will give a prolific crop of spots on the picture. Having washed off the tripoli, plunge the plate into a deep dish of water, and there let it remain until six plates or more have been in like manner cleaned; then take each out singly, again wiping the edges with a tuft of cotton, and pass each plate through a dish of distilled water. Do not set up more than six at a time to drain; when six have been thus treated, commence drying off the first set up. The plates must not be allowed to become dry before rubbing with the cloths. In order to dry them quickly and effectively, place upon the table a piece of felt or ironing-blanket, over which spread one of the cloths (washed in clean water without soap); place the plate upon this, and rub it well on both sides with another cloth doubled up so as to form a pad. One side of this plate should be marked with a diamond, and upon this marked side the greatest care should be bestowed. The plates, so far cleaned, may be stowed away in a box; before use, however, the final rub must be given, to remove all superfluous moisture; this is best effected by two wash-leathers previously purified by washing and rinsing them freely in water for two days or so; they must be allowed to dry spontaneously. Lay the plate upon one of these leathers, and rub it well on both sides with the other leather doubled up so as to form a pad. Breathe occasionally upon the plate whilst rubbing; this tends to equalize the moisture. Rub, lastly, with a well-washed silk handkerchief. Even now some small particles of fibre may be left from the cloths, and these attach themselves very tenaciously to the glass; in order, therefore, to remove these enemies to an absolutely pure plate free from "comets," I take a flat and broad camel-hair brush 2 inches wide and pass it firmly over the plate just before pouring on the collodion. This brush must be most carefully prepared for the purpose by soaking it in water for two or three days and rubbing out all dust and extraneous matter with the fingers; it must then be suffered to dry spontaneously, and kept free from dust in a card-board box: if this cleansing be neglected, more impurities will be added to the plate than removed from it.

I have been at some pains to describe clearly a systematic method of plate-cleaning, feeling certain that the necessity for carefulness in this process is not sufficiently attended to. I am sure that nearly all "comets" and other abominations arise from the imperfect removal of fluff and fibre from the plate. These minute particles are not seen until draining off the collodion; they then show themselves in the

form of nuclei, checking the collodion in its course, and, what is very much to be avoided, contaminating the collodion, which becomes full of floating particles, and thus prevents the possibility of getting clean plates until the collodion has again been allowed to settle; if, therefore, it is required to make experiments only, without regard to the purity of the result, keep a bottle of collodion for this purpose.

When working at home with all the conveniences described at hand, plates used (if the picture is not approved of) may be at once placed in a dish of water; the film then floats off and carries with it all impurities; simple washing and drying as described are then sufficient. New plates must always be put through the whole process, and also those which have become dry with films on.

A perfectly clean glass shows little or no irregularity, on the surface when breathed upon, having then very much the appearance of ground glass, and, if properly dried, the moisture flies off rapidly. Collodion flows easily and freely over a well-cleaned and dry plate, presenting a surface free from irregularities, either before or after the action of the nitrate of silver bath.

The practice of cleaning glass plates with detergents, said not to require subsequent washing, is one fraught with great risk and full of objection; it is impossible to get rid of fixed alkalies or salts by mere friction with a cloth without washing. I allude to this method of cleaning(?) because I know that it has been a cause of much trouble to many who have for a time adopted the plan; moreover, it is *by this process* impossible to remove the tripoli from the ground edges of the glass.

Mr. Shadbolt on Distortion.

To the Editor of the Photographic Journal.

Edinburgh, 9th July, 1860.

SIR,—In your last Number (page 252) are some remarks made by Mr. Shadbolt at the last meeting of the Photographic Society, which require a reply.

Referring to a Report on Lenses submitted to the Photographic Society of Scotland about a year ago, he says that, when that Report was issued, "he pointed out the fact that they"—the Committee—"assumed to have discovered something extraordinary—that the position of the diaphragm in front of the lens produced the barrel-shaped image of a square original, and the diaphragm behind produced the hour-glass-shaped image." The novelty of this doctrine must, I presume, have fairly taken away the breath of the optical portion of Mr. Shadbolt's audience, as none of them seem to have called it in question.

But the lenses through which Mr. Shadbolt has read the Report seem to have had a diaphragm both in front and behind, and to have produced a compound distortion of such an extensive character that nothing of the original has been left at all. For the benefit of Mr. Shadbolt and any others who may have taken his *ipse dixit* in this matter, allow me to subjoin an extract from the Report, from which it will be seen that Mr. Shadbolt's memory really does require the apology he made for it on that occasion:—"The stops of all the Petzvals were, with one exception, placed close to the back combination; one, however, had it placed before the *front* lens, and as this one was considered to give very good definition, it may hence be inferred that the position of the stop (in this class of lens) is not of so much importance as some deem it."

Mr. Shadbolt, in speaking or writing about the Report, is of course at perfect liberty to apply to it any adjectives he may deem proper, but it is obvious that the cause of scientific investigation will best be benefited by greater accuracy in quoting the opinions of others.

J. T. TAYLOR.

On the Preparation of Collodion.

By F. MAXWELL LYTE, F.C.S.

To the Editor of the Photographic Journal.

SIR,—As I believe the Collodion Committee are still open to receive and consider any formulæ which may be presented to their notice, I beg to offer one, which, while it contains a new combination, is very far superior to anything I have yet tried as a working collodion.

Pyroxyline.

I prefer the use of paper to that of either cotton, flax, or any other material, and I imagine that it gives a firmer and more structureless film than any other. The paper I use is the common *papier à cigarette*, which is easily permeable by the acids, and is made from linen, not cotton. Take—

Nitric acid	sp. gr. 1·38	$6\frac{1}{2}$ fluid ozs.
Sulphuric acid	sp. gr. 1·60	$16\frac{1}{2}$ fluid ozs.
Nitrate of potass, powdered and well dried		5 ozs.
Paper		300 grains.

Mix first the nitrate of potass and the nitric acid together, and, on stirring, the salt will nearly all dissolve; then add the sulphuric acid, and take the temperature with the thermometer. It ought to mark about 130° Fahr. Should the temperature be over 130°, it is too

hot, and must be allowed to cool a little; should it be below 130°, heat must be carefully applied. When the right temperature is obtained, take the paper—which should previously be cut into squares of convenient size—and plunge it into the acid, assisting the operation by means of glass rods: let it be added by separate sheets at a time. It may remain in the acid, covered up, for half an hour or an hour; and the excess of acid being poured off, the whole should be thrown into a large vessel of water, and the bits of paper separated as rapidly as possible, so as to make the first abstraction of the adherent acid as speedy as possible. The paper may now be put into a net (a cabbage-net answers well), and placed in a running stream, and left there for eight or ten hours. And, lastly, the paper should be soaked in a solution of acetate of soda, ¼ of an ounce to a quart of water, and again washed in running water for a short time, and dried in the sun, or hung up in the net to dry.

To prepare Normal Collodion.

Take highly rectified and washed
ether . . . . 1 imp. quart.
Pyroxyline . . . . 120 to 140 grs.

Add the pyroxyline to the ether, shake them well together, and then add, little by little, some absolute alcohol. As soon as the right quantity of alcohol has been added, the paper will be seen to become transparent and break up; then shake the whole till it is dissolved.

As commercial ether contains variable proportions of alcohol, we cannot say beforehand how much will be required to be added; but the reaction of the paper, when well observed, enables us at the same time to perform a sort of proximate analysis in this respect, to obtain a collodion containing a constant proportion of alcohol. The collodion so made should be let stand till settled, and then drawn off by a siphon, or poured off into a clean bottle which has been previously washed out with strong alcohol. It should be kept in a dark and cool place.

To make the iodizing solution, take—

Iodide of sodium.
Iodide of cadmium.
Bromide of cadmium.
Alcohol of sp. gr. 800 to 810.

Mix, and when dissolved, filter the solution into a clean bottle which has been well washed first with some strong alcohol. This iodizer is to be mixed in the proportion of one part to three of normal collodion, and after being so iodized, the collodion should be let stand for four or five hours at least before using; but it does not come into perfect condition and good working order for twelve hours or more.

Of all collodions I have ever used, this is the most rapid and uniform in its action, and it gives a dense creamy and structureless film.

I do not wish to claim for myself that I am the first to mention the possibility of using the iodide of sodium in collodion, but I think I am the first to practically adopt it.

Iodide of sodium is to be prepared in several ways; but I think the best mode will be found to be that recommended in the London Pharmacopœia for preparing iodide of potassium, only substituting 4 ounces and 417 grains of the bicarbonate of soda for the 4 ounces of carbonate of potash there recommended. The salt may also be prepared in a state of considerable purity by adding together equivalent proportions of iodide of potassium and bitartrate of soda, both separately dissolved in water; but however it is made, it should be evaporated to dryness, and used in that state, not crystallized; and it should be kept in a well-stoppered bottle, as it is extremely deliquescent.

Cheap Lenses for Photography.

To the Editor of the Photographic Journal.

12 Park Street, Stoke-upon-Trent,
June 14th, 1860.

Sir,—The price of lenses has to me at all times been a matter of surprise, and had I been dependent on their use, I never should have ventured as an amateur upon the practice of photography; but having made my own cameras for View and Portrait as well as Stereoscopic purposes, allow me to state, for the benefit of the public generally, that I have invariably used the double-convex lenses—any medium spectacle-glass will do. By placing two of these in a tube at a short distance from each other, as their focuses may determine, I can obtain by the aid of diaphragms, with very little variation of the focus from visual to chemical, with one and the same camera, both portrait and landscape with accuracy,—and that too with a softened outline such as nature is ever wont to present, and very different from many I have seen produced by very expensive lenses, with their cut and carved appearance, such as a pair of scissors alone may be expected to produce. I have also used lenses of 4½ inch diameter with equal success, employing diaphragms of ⅝ths, ⅞ths, 1½ inch, and 2¼ inch, according to the light; and for arriving at the chemical focus, I have marked one side of the camera-slide with inches and eighths, as on the common carpenter's rule, and by this means have obtained a most distinct and artistic image.

Having read your Journal attentively for many months, and feeling that the object of

your Society is that of advancing the art rather than the furtherance of any mere private interest, I have ventured to address you, and you are at perfect liberty to make what use you think proper of my communication.

You may suppress it if you think the lens-craft in danger, or publish it if you wish to rub off some of the many excrescences that yet hang about the art, and which tend to retard rather than further its best interests.

JOSEPH SMITH.

Short Weight and Measure.

To the Editor of the Photographic Journal.

Melbourne, Victoria, April 17th, 1860.

SIR,—Permit me to call your attention to a grievance which we professional photographers in this distant part of the world labour under when ordering goods from the home manufacturer or dealer. I, for instance, order a certain number of pounds of, say, ether, alcohol, acetic acid, or collodion, as the case may be; but when these things arrive, I find that for a pound charged for, I receive from one house 16 fluid ounces, from another perhaps 20 fluid ounces, but rarely, if ever, 16 ounces avoirdupois weight. I do not allude to cases where short measure or weight may be accounted for by evaporation or leakage, but to instances where the bottles arrived full and in as good condition as when shipped.

This, Sir, is, to say the least of it, annoyance to the photographer, and, I am inclined to think, very like dishonesty on the part of the dealer or manufacturer.

I would beg to suggest as an effectual remedy, that you would state in your invaluable Journal what, in the opinion of respectable tradesmen, constitutes a pound and a pint respectively of each of the fluid chemicals used in photography. This would secure to the purchaser the quantity paid for, and enable him to know when he was honestly dealt by or otherwise.

J. N.

⁂ We are informed that it is the custom of the trade to supply 16 ounces avoirdupois when a pound of any fluid is ordered, and 20 fluid ounces for a pint, the charges being regulated accordingly. Sufficient distinctness is often not given when the order is sent.—ED.

Application of Photography to Zincography.

To the Editor of the Photographic Journal.

2nd July, 1860.

SIR,—Since the first notice in your Journal of Colonel Sir H. James's beautiful and valuable application of photography to zincography, many amateurs have, to my knowledge, attempted to follow the modes of procedure sketched in the reports presented in your pages.

I have also wrought hard at the process, in the fond expectation of making some successful hit; but as yet, my success, like that of my ardent friends, has been very partial and unsatisfactory.

I feel persuaded that our failures have arisen more from our non-acquaintance with some of the minor practical details of the process (which are not stated in any of the notices in the Journal), than from any want of duly comprehending the principles on which the process is grounded.

I was in the hope that some further details would have appeared in the last Number of the Photographic Journal, or that some one would have written for such information as I now seek; but as the subject has not again been taken up in your pages, I venture to solicit information from any one who is practically familiar with all the steps of the process.

It seems to me essential that—1st, the *exact composition of the transfer ink* should be stated; 2nd, its *degree of consistency, and mode of making it so*, previous to its application to the plate or paper; and 3rd, the *proper mode of applying it* should be minutely described, in order to give the learner a fair chance of producing results worth making use of; as I am sure that it is upon attention to matters relating to this branch of the process that a great deal of the success attending it depends.

It would indeed be a boon conferred upon photographers who have the desire to extend the application of their beautiful art into the most useful channels, if some practical man would favour your wide-spread Journal with an article on the subject; and a small published treatise, wherein every little step of the process is rendered plain and practicable, would, I am sure, be eagerly sought after.

If, however, such a treatise has already been published for general use, or if that "Account of the methods . . . . . drawn up for the use of the officers . . . . . by Captain A. de Courcy Scott, R.E.," can be obtained by the public, perhaps you would be kind enough to inform your readers.

R. D.

⁂ In inserting our correspondent's communication, we trust that some of our numerous readers who have met with success in following out this most useful process, will favour us, for publication, with the results of their experience. The Report of the Ordnance Survey is published by the authority of the Secretary of War, and we believe can be purchased at the same ratio that Parliamentary papers can be procured.—ED.

The Phototype Printing Process.

To the Editor of the Photographic Journal.

36 Porchester Terrace, Bayswater, London,
July 9th, 1860.

SIR,—Since the publication of my little specimen print in your last Number, I have received numerous letters, wherein I am asked to communicate the process by means of which I print in "Phototype;" and this, although you mentioned at the time that it was *not* intended to render the process public for the present.

After very arduous and persevering labours, I have obtained sufficient command over the process to be enabled to print photographs of any size with success; and I hope to attain still better results, and, especially, that experience will enable me to arrive at an easier and more rapid way of manipulation. As soon as I have secured so desirable an object, I shall be glad to see others share in the advantage, as I firmly believe that a perfect mode of printing, combining with the refinement of the nitrate of silver print the quality of *positive permanency* in not being liable to fade away, under any climate, will eventually lead to the adoption of the mode of printing I am now introducing in preference to any other. F. JOUBERT.

Gum for Mounting must be used Fresh.

To the Editor of the Photographic Journal.

The Vicarage, Tilshead,
22nd June, 1860.

SIR,—It is stated in, I think, more than one Number of your Journal, that gum is a very *convenient* adhesive substance for mounting photographs—a fact sufficiently evident to every one; and had the writers left the matter there, I should have thought it unnecessary to make any remark upon the subject; but I find that a Mr. Sinclair, to enhance its value for the purpose, confidently informs us that it (the gum) will keep *perfectly fresh if dissolved with boiling water*. It is difficult to conceive what the temperature of the water can have to do with the preservation of the fluid. I once saw a professional gentleman mounting prints with gum-water so made, and was assured that there was no acidity about it. I at once told him he was mistaken; and a piece of litmus paper was immediately put into it, to prove that the artist was right, when it instantly became red. If an acid cement be injurious to the pictures, of which I have little doubt, the gum must be used fresh. A single picture can, however, be mounted in less time by the use of recently dissolved gelatine.

J. H. JOHNSON.

P.S. It is a good plan to roll down the prints with a ruler covered with india-rubber tubing.

[We should recommend our Correspondent on all occasions to use either gelatine or a solution of dextrine. We have found the latter very convenient, and it appears in every respect suitable. India-rubber tubing contains a portion of sulphur, and the use of it is not to be recommended in the way proposed.—A machine constructed of metal rollers varying in size gives a very beautiful gloss, and adds much to the beauty of mounted photographs; the price of the machine depending on the size. They may be procured of Messrs. Bourquin of Newman Street.—ED.]

REVIEWS.

Photographic Apparatus, Processes, &c. &c. By Messrs. MURRAY and HEATH. 1860.

Messrs. Murray and Heath have just issued their annual publication. It contains much information useful to photographers, and may be consulted with advantage by the long-experienced; for, in addition to the contents of former publications, it contains in a condensed form an excellent account of the novelties which have been introduced into the art during the past year. We have experienced great kindness from Messrs. Murray and Heath, in explaining "various new contrivances," and feel sure that our readers in general will do well to make a similar visit of inspection for themselves.

Practical Hints on Photography, its Chemistry and its Manipulations. By J. B. HOCKIN. London. 1860.

WE were much pleased to receive the above little work, which the author states is, in fact, a fourth edition of his 'Practical Hints;' and we well remember when working with the late Mr. Archer, and little was comparatively known of his discovery of the collodion process, with what satisfaction Mr. Hockin's first edition was perused.

That our readers may judge for themselves how desirable it is for them to possess Mr. Hockin's present edition, we give a *résumé* of the subjects treated under the head of Apparatus: Chemicals and Manipulation—The Lens—Single Achromatic—Double ditto—Orthoscopic—Stop or Diaphragm—Camera—Stereoscopes—Tent—Tripod Stand—Bath and sundry apparatus—Pyroxyline—Collodion—The Nitrate Bath—Developers—Fixing Agents—Dark and Operating Rooms—Cleaning the Plate—Coating and Exciting—Exposing—On Focusing—Developing—Fogging and other failures—Positives on leather—Alabastrine process—Fixing and varnishing—Dry Collodion Processes—

Photogalvanographic Process—Positive Paper—Printing—Toning—Printing by Development—Mounting Photographs—Analysis of a Picture—On Saving Residues—Removing Stains—Negative Paper Process—On Optics, by C. P. Symonds, C.E.—On Conjugate Foci, by C. P. Symonds, C.E.—Copying and Enlarging Moon Photographs—Chemical Manipulation—Photographic Chemicals, &c. &c.—all of which being comprehended in a little more than 150 pages, with clear marginal references, adds much to its convenience of use.

To extract from Mr. Hockin's book that which is the more useful would be difficult, as we consider every part well worthy of attentive perusal; it speaks for itself that it is written by one practically informed and of long experience. We should not have objected to a little extension of his directions for practising with success the paper processes, which we believe to be far more useful and available than nine-tenths of the various dry collodion processes which have been recommended. A perusal of the communication of Capt. Biggs of the Bombay Artillery, published in our last Number, together with an inspection of the beautiful pictures which were exhibited, must convince most persons of the accuracy of our opinion.

Our actual experience of the ill effects produced by the use of cyanide of potassium in some few cases makes us differ with Mr. Hockin in his directions for removing photographic stains, and in our own manipulations we have never used it. It is well known that there are well-authenticated cases of persons being injured by the use of this chemical who have used it on numberless previous occasions with impunity. At the present time we happen to know two friends who are affected by the mere smell of hydrocyanic acid. Any observations calculated to diminish care in the application of cyanide are to be condemned; and Mr. Hockin, after observing that "I consider the alarm is quite unfounded," adds, "I must caution the unwary that it is only to be applied to the comparatively *hard* skin of the hands." Certainly, take it altogether, Mr. Hockin's is one of the most useful manuals which have appeared.

Photography in the East.

Captain Allan Scott of the Madras Artillery has politely sent us, through his agent, Mr. Bolton, 146 Holborn Bars, twelve stereoscopic pictures from negatives of his own taking. They are the first instalment of a series intended to illustrate scenes and life in the Madras Presidency. The scheme is an unusually happy one, and Captain Allan Scott, who has long been known as a successful photographer, is clearly determined to work it out in a manner that shall leave the critic nothing to desire. The specimens before us are so altogether out of the common way of photography, that it is literally a new sensation to look at them through the lenses of a stereoscope. Ten minutes spent in their company gives the beholder a more vivid impression of Oriental life than a year's hard reading would impart. No one either caring for photography, or having reasons for especial interest in the people and scenery of Hindostan, should be without them. The Palace, the Temple, the Council, and the Fort rise up with a reality and exactness that make them spots of personal observation. We shall look with eagerness for a further instalment of the series, and shall, besides calling the attention of the public from time to time to their progress, take any opportunity of describing and discussing them with the care and minuteness which works of such unusual excellence deserve.

On the Principles of the Solar Camera. By A. Claudet, Esq., F.R.S.

The solar camera, invented by Woodward, is one of the most important improvements introduced in the art of photography since its discovery. By its means small negatives may produce pictures magnified to any extent: a portrait taken on a collodion plate not larger than a visiting card can be increased, in the greatest perfection, to the size of nature; views as small as those for the stereoscope can be also considerably enlarged. This is an immense advantage, which is easily understood when we consider how much quicker, and in better proportion of perspective, small pictures are taken by the camera obscura, while the manipulation is so greatly simplified.

There is nothing new in the enlargement of photographic pictures. This has been done long ago simply by attending to the law of conjugate foci; and every photographer has always been enabled, with his common camera, to increase or reduce the size of any image. For the enlargement, it was only necessary to place the original very near the camera, and to increase the focal distance in proportion. But the more the focal distance was increased, the more the intensity of light was reduced; and a still greater loss of light arose from the necessity of diminishing the aperture of the lens, in order to avoid the spherical aberration. Such conditions rendered the operation so long, that it became almost an impossibility to produce any

satisfactory results when the picture was to be considerably enlarged. For these reasons, it naturally occurred, that if the negative, having its shadows perfectly transparent and its lights quite black, was turned against the strong light of the sun, its image at the focus of the camera would be so intense that the time of exposure would be considerably reduced; so that, in order to employ the light of the sun, and follow easily its position without having to move constantly the whole camera, it was thought advisable to employ a moveable reflecting mirror, sending the parallel rays of the sun on a vertical plano-convex lens condensing those rays on the negative, placed before the object-glass, and behind the condenser, somewhere in its luminous cone. Many contrivances for this object were resorted to, but without considering anything more than throwing the strongest light possible on the negative to be copied. The constructors of these solar cameras never thought it very important to consider whether it was better that the focus of the condensing lens fell before or behind the front of the object-glass, provided the negative was placed in the luminous cone of the condenser. This want of attention has been the cause which has made the solar camera a very imperfect instrument for copying negatives.

The beautiful principle of Woodward's apparatus consists in his having decided the question of the position of the focus of the condenser, and in having placed it exactly on the front lens of the camera obscura. As this principle had not been explained when the invention was exhibited before the Photographic Societies of London and Paris, and not even by the inventor himself in the specification of his patent, Mr. Claudet has undertaken, in the interest of the photographic art, to bring the subject before the British Association, and to demonstrate that the solar camera of Woodward has solved the most difficult problem in the optics of photography, and is capable of producing wonderful results. This problem consists in forming the image of the negative to be copied only by the centre of the object-glass reduced to the smallest aperture possible, without losing the least proportion of the light illuminating the negative.

The solar camera does not require any diaphragm to reduce the aperture of the lens, because every one of the points of the negative is visible only when defined on the image of the sun, and all the points of that negative are so in that position exclusively; for the centre of the lens is the only point which sees the sun, while the various points of the negative, which from the marginal zone of the lens are defined against the comparatively obscure parts of the sky surrounding the sun, are, as it were, invisible to that zone; so that the image is produced only by the central rays, and not in the least degree by any other points of the lens, which are subject to spherical aberration. It is, in fact, a lens reduced to an aperture as small as the image of the sun upon its surface, without the necessity of any diaphragm, and admitting the whole light of the sun after it has been condensed upon the various separate points of the negative. It is evident that from the centre of the lens the whole negative has for background the sun itself, and from the other points of the lens it has for background only the sky surrounding the sun, which fortunately has no effect in the formation of the image.

Such is the essential principle of Woodward's solar camera, which did not exist in that instrument when the focus of the condenser was not exactly on the object-glass. This principle is truly marvellous; but it must be observed that the solar camera, precisely on account of the excellence of this principle, requires the greatest precision in its construction. For its delicate performances it must be as perfect as an astronomical instrument, which, in fact, it is. The reflecting mirror should be plane, and with parallel surfaces, in order to reflect on the condenser an image of the sun without deformation; and in order to keep the image always on the very centre of the object-glass (the only condition for the exclusion of the oblique rays), the mirror should be capable, by its connexion with a heliostat, of following the movements of the sun. The condenser itself should be achromatic, in order to refract the image of the sun without dispersion, and to define more correctly the lines of the negative; and a no less important condition for losing nothing of the photogenic rays would be, to have it formed with a glass perfectly homogeneous and colourless. With such improvements, the solar camera will become capable of producing results of the greatest beauty; and, without any question, its introduction into the photographer's studio will mark a period of considerable improvement in the art.

Photography and the Japanese.—Newspapers and photography have lately discovered to the mass of the American people a new world. Only a few weeks ago, the word Japan was associated with tea-trays and melanotype plates, or to those a little more learned it would recall the picture of semi-savages trampling on the Christian cross. Now, Japan means a great em-

pire wherein useful arts flourish, and the graces of politeness and hospitality abound. All the children understand what a No-Kami is, and all the young ladies think of Tommy as their especial friend. Photography has enabled the people to know just how the most notable of the Japanese Embassy appear; there is scarcely a town in the United States where any one of them could not be recognized and called by his right name. Some of the photographs are as good as a book, from which to learn the state of the arts and manners and customs of the Japanese. Our enterprising photographers in San Francisco, Washington, and New York availed themselves of every opportunity of practising their captivating art, and the Embassy have been taken *en masse*, in detail, and in all sorts of grouping. Whenever daylight falls on a Japanese, some photographer is watching to bring his camera in range. In Broadway the Embassy will run the gauntlet of a hundred cameras. The Japanese have a high appreciation of the art, and are as pleased as children to see their faces on paper. They sit patient and still, as any one will observe by examining their portraits. They have also learned the art themselves, and no doubt photography will soon be practised as successfully in Jeddo as in New York.—*The American Journal of Photography.*

CORRESPONDENCE.

Amateur.—Your question has been answered fully in another journal, and we quite agree in the reply you have received.

A. L. (Captain).—You had better apply to the London Stereoscopic Company. We believe that the Views of American Scenery were originally published by those who supply the various metropolitan dealers.

SIR,—I observe some collodion films, such as Fisher's and Ramsden's, to be so very tender that a gnat lighting on them is sufficient to injure the wet picture. I find I cannot produce this extreme porosity, although my gun-cotton, made with hot and weak acids, has been so rotten as scarcely to stand washing, and the solvents two-thirds alcohol and 180¼ ether.

I imagine some chemical is added to produce this effect; pray, can you say what it is?

Other collodions, such as those of Bolton, Thomas, &c., have a much tougher film, yielding a better-bodied picture, but appearing to be more liable to marks and stains. Am I correct? CORNISH CHOUGH.

We think it likely that the methylated spirits have some effect in making the film porous; and possibly a little free alkali is present, which produces the same effect on collodion after keeping for a few weeks.

Amateur (Bromsgrove).—Our own course is to collect all refuse of silver, either from a deteriorated bath or otherwise, and reduce it to a metallic state. This is done by refiners at a very trivial cost, or they will purchase this refuse at a fair price. You may rely on meeting with more satisfactory results, and save cost, by the use of a new bath and absolutely pure nitrate of silver, than by attempting any renewal yourself, however adept at manipulation.

J. R.—The Council of the Photographic Society will be happy to receive your communication. It is not requisite to be a Member of the Society in order to read a paper at one of the Ordinary Meetings.

An Old Subscriber.—Neither the letter nor stereoscopic views have been received.

W. S. (Southampton).—Absence from London has at present prevented inquiries on the subject on which you write. Your request shall be at once attended to.

Bridgwater, July 6, 1860.

SIR,—Will you kindly inform me, through the medium of your 'Journal,' what is meant in Mr. Macnair's 'Malt Process' by the following words:—"Excite in a *neutral bath* of 35 grs. of silver per ounce of water"? I have tried it by using the usual crystals of nitrate of silver and distilled water, which was what I understood by a neutral bath, and have not succeeded in getting good pictures, always having them fogged or developed in patches. Thinking that perhaps some others may be in the same position as myself, I thought that I would ask the question. A. J. L.

We think Mr. Macnair's directions cannot be understood otherwise than as you have understood them. You are not a solitary complainant, however, of want of success. It will afford us much pleasure to give any further elucidation of the process with which Mr. Macnair may favour us.

2nd June, 1860.

SIR,—I would feel much obliged to if you would inform me *which* is the best dry collodion process; I should like to be able to keep the plates for at least two months after preparation. Will you kindly answer in the July Number of the 'Photographic Journal.' and also mention where details of the process can be obtained by which the plates can be prepared?

M. H. H. J.

Your queries are very difficult to answer, because of the differences of opinion existing amongst those who practise the various processes. It seems, however, to be pretty generally admitted that the Taupenot process and its modifications are best suited for plates of a tolerable size, and we would refer you to Mr. Ackland's paper thereon for more minute information. Mr. Rosling's pictures in the late Exhibition were charming illustrations of what may be accomplished by this process with careful manipulation. The Fothergill process seems to be highly successful in the hands of many, but it is especially adapted for the stereoscopic size, on account of the difficulty which exists of keeping the film sufficiently adherent to the plates when that size is exceeded. There are also several other processes described in the pages of this Journal, especially one by the Rev. Mr. Cleaver, whose pictures are very excellent, as well as Mr. Barnes's recently. Of the Malt process of Mr. Macnair, so confidently recommended by our friends in Edinburgh, we have not had sufficient experience to speak; we are, however, sorry to have to admit that several complaints of want of success have been addressed to us. The dry plates of Dr. Hill Norris may be procured at the establishments of many respectable dealers in photographic apparatus, and some who have used them are perfectly satisfied with their success.

Communications received.—H. de Lisle; W. G. Smith; G. Grove; Rev. J. Craig; Mr. Lambley; Mr. Bird; Mr. Highly; Mr. Rodgers.

Letters of inquiry to the Editor can be answered only through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 100. AUGUST 15, 1860.

We beg to call the attention of our readers to a question of considerable importance. By a recent motion in the House of Commons, a Committee was appointed to receive evidence and to report on the general management of the Department of Science and Art at South Kensington. In the course of the inquiry, the general question of photographing, as conducted by the Department, was gone into; we now propose giving an outline of the evidence. It appears that some time ago the Managers of the Department of Science and Art thought it desirable that photography should receive as much attention as any other branch of art, and for that purpose they attached a photographer to the establishment for the purpose of executing photographs for the Museum, and for the use of the students in the School of Art in connexion with the Department.

This step did not attract particular attention at the time; it was rather looked on as being likely to benefit the art by an extension of its knowledge, and also that it would be a means of showing the capabilities of photography in reproducing faithfully pictures and drawings by the old masters. Had the Department continued as they begun, in all probability little notice would have been taken of their proceedings, but it appears that in 1858 the Management thought that the usefulness of the Department would be greater if it extended to the general public the advantages which up to that time the students of the schools alone had enjoyed. This has called forth the strong opposition of the publishers, who lay down as a general rule, that a Government Department has no right whatever to undertake any work which interferes with private enterprise; because it crushes the private individual, who pays a portion of the taxes which are used against him. The evidence given by one of the official managers was to the effect that the Department chiefly undertook the reproduction of works of art which were not accessible to the photographic profession. How this is disproved by the evidence will be shown further on. Before going into the evidence, we may here give an outline of an exactly similar case which occurred in 1849. The Government at that period had given powers to the Educational Board to produce cheap books for the use of schools; whereupon the question was at first taken up by Messrs. Longmans and Mr. John Murray, and subsequently by all the leading London publishers. The result of the agitation was, that the publication of school books by the Government was dropped, as the position it had taken up was found to be entirely antagonistic to the interests of the publishing trade. The line of argument taken up at that period is so entirely suited to the present case, that we will give a few extracts, using the word photographs for books.

Messrs. Longmans and Mr. Murray, in a letter dated December 7, 1849, addressed to Lord John Russell—"My Lord, we beg leave to call the attention of your Lordship to the fact, that the books [photographs] published by the Irish Education Commissioners are sold in England at prices below those for which such books [photographs] can be sold by booksellers in this country;—that a proceeding of this sort is an unjust and impolitic interference with private enterprise, and that it not only encroaches upon, but completely supersedes, the sound principle of private competition. It is true that in former times some trades were propped by bounties and premiums, sometimes on production and sometimes in exportation. The impolicy of this course has been demonstrated and universally admitted;

and it is inconsistent and contradictory in a Government which proclaims its devotion to the principles of Free Trade, and has exerted itself for their promotion, to interfere with any department of industry, or to favour one more than another. But in the case to which we would call your Lordship's attention, the Government of England has done, and is doing, more than this: it has set up as a producer, and while it leaves an important branch of trade heavily burdened with taxes, it scruples not to enter into competition with the parties so burdened, *employing the produce of the taxes to which they so largely contribute as capital to undersell and supplant them* in their business. It would be a novel feature in the internal economy of this country, more especially since Free Trade has been in the ascendant, were Her Majesty's Government to take possession of the Isle of Wight, or some other district, to grow corn upon it, to construct bakehouses, and to supply the people with bread at less than its cost price, making up the deficit by taxes levied on those very agriculturists whom the Government had thus done its best to destroy. This, we think, would scarcely be tolerated; yet in what respect is the production and sale of books [photographs] by Government at less than they cost, more reasonable or proper?"

In a subsequent portion of this correspondence, Messrs. Longmans and Mr. Murray said, that "they would not fear the competition of private parties coming into the field under the same circumstances as themselves; but the Government would not be surprised when they confessed their inability to contend with parties to whom expense was no object; who did not trade on their own funds, but on funds derived from the taxes to which they had contributed their full share; whose works, how indifferent soever, were patronized by Government, and whose losses of every sort were all made good out of the National Exchequer. Private enterprise could do much, but it would be unreasonable to expect that it should make head against such fearful odds."

The result of the correspondence just quoted was, that the Government, when the contract had expired, did not again renew it, thereby abandoning their position as publishers.

The grounds now taken up by the publishers of photographic works are in every respect similar; and considering that the Government acted with a judicious prudence in withdrawing from a false position, we trust the present Government will follow the precedent thus created.

Messrs. Paul and Dominic Colnaghi, Scott and Co., in conjunction with the photographic house of Messrs. Caldesi, Blanford and Co., who, from the nature of several of their publications, have been the first to suffer from the acts of the Department of Science and Art, are the parties that have come forward to oppose the monopoly which is being sought to be established.

We think it cannot but be seen that it behoves every photographer to support them in urging the just claims of photographic publication. Mr. John Scott, a member of the firms of Messrs. Colnaghi, Scott and Co., and also of Messrs. Caldesi, Blanford and Co., was summoned to give evidence before the Committee. We have examined Mr. Scott's evidence, in which he stated that the operations of the Department of Science and Art had had the effect of entirely destroying photography in its higher branches as a profession. He had been authorized by Mr. Roger Fenton, one of the Vice-Presidents of the Photographic Society, to say, that since the establishment of the Photographic Department at Kensington, he had given up all the higher branches of photography, as he found himself unable to compete with a Government Department. Mr. Scott proceeded then to enumerate the works which have produced these damaging effects upon photographic publication, among which were the Cartoons by Raffaelle at Hampton Court, the Raffaelle drawings published by the Department, &c.; but he more particularly alluded to the tariff of prices at which they executed works.

Several questions were then put and answered; but as they are more or less of a personal nature, chiefly referring to the obstructions put in the way of Messrs. Caldesi, Blanford and Co. by the Government photographer, and as they consist of elaborate details, we refer our readers to the evidence.

Messrs. Colnaghi, Scott and Co. find that the expenses which they have to incur in the production of their photographs are greater than the selling price of the Department of Science and Art,—the relative prices being respectively 16*s.* 6*d.*, for which the Department charge but about 11*s.* Thus showing, by the tariff of prices issued by the Department, that photographs are sold at less than actual cost.

The Irish Commissioners, in the Book question to which we have alluded, showed in their report that their operations were carried on at a profit, that profit being allowed to accumulate to pay original and copyright expenses. It appears to us, as it no doubt will to our readers from the data given, that no such means are taken at Brompton to clear the original expenses involved in the taking of the negatives. Then the evidence proceeds with a charge that

the Department had unjustifiably reduced the prices too far below what even their own photographer considered a fair selling price. To substantiate this, Mr. Scott produces the Catalogue of the Photographic Exhibition, and there he finds the prices to be almost identical with the prices of those of Messrs. Caldesi, Blanford and Co. A quotation is then made from the official Catalogue of the Department of Science and Art, showing the reduction, wherein photographs are sold by the square inch; for example, 5 × 7 inches, 5*d.*; 40 square inches and under 60, 7*d.*, and so on, at a proportionate scale for larger sizes. This is followed by an announcement that "the Government photographer is ready to go out to other public museums and galleries on similar terms to private photographers, viz. £2 2*s.* a day for attendance and incidental expenses, charging for negatives at the rate of 3*d.* the square inch."

One of the chief reasons which induced the Department to carry out this scheme was, as we have already said, that they might photograph things to which the profession could not obtain access. This is refuted by a letter which Messrs. Colnaghi, Scott and Co. addressed to the Trustees of the British Museum, applying for permission to photograph the Elgin Marbles, when, notwithstanding that the Department had established its photographer there, Messrs. Colnaghi, Scott and Co. were permitted to photograph also.

Mr. Scott then mentioned various publications of an expensive nature which his firm were producing, and said that there was nothing to prevent the Department from doing the same thing, and publishing, at a nominal price, what was sold at very much higher prices by his firm; saying that they "had to live by the sweat of their brow, and to produce the taxes, part of which went to the support of the Department of Science and Art."

Various questions were put by the Committee, chiefly with a view of ascertaining whether many difficulties arose from the attempt to photograph in public and private collections, which were answered by the fact that neither Messrs. Caldesi, Blanford and Co., nor other photographers with whom they were acquainted, had, as a general rule, found any difficulty in photographing in any public or private gallery. The profession, we are satisfied, will feel that this part of the case of the Department of Science and Art is contrary to the experience of all practical photographers, as permission has almost invariably been granted by the nobility and gentry of this country, from the Queen downwards, if the photographer applying had any warrant for his application.

Several questions were put by the Members of the Committee with a view of eliciting whether Messrs. Colnaghi and Co. would have objected to other private photographers taking copies of the same works; the answer to which is, that they would not, as private competition was of an entirely different character to the downright oppression of a Department which used public money to crush private enterprise.

Mr. Cole had stated in his evidence that "they had scrupulously avoided photographing anything which the public could photograph for itself." The case of the Cartoons was a direct contradiction of this; as, according to official correspondence in existence, the idea of photographing the Cartoons originated with Signor Caldesi in 1854—three years before he was acquainted with Messrs. Colnaghi, Scott and Co.—so that his permission to photograph there was prior to that obtained by the Department.

Mr. Cole grounded his defence of the Government monopoly on the fact that private individuals would more readily entrust their property to a Government department than to private enterprise. A list of names is then given, showing the liberality with which private and public collections have been thrown open to private enterprise. It will be seen that the ground taken up by the Department of Science and Art is in direct opposition to the pecuniary interests of the photographic profession. With this outline of the case we leave the matter for the present to the consideration of the photographic profession, merely observing that it is only by the exercise of a profession in its higher branches that excellence can arise. The effect of the Government monopoly at Brompton will inevitably be to throw the production of higher works of art into the hands of a Government photographer; the influence of the Department, upon the showing of the official managers of the Department, being used to close the public and private galleries to all but the Government photographer, and to establish the feeling that valuable works of art can with safety only be entrusted to a Government monopoly. We need not point out to our readers that with such an oppression as this it is impossible for the higher branches of photography to thrive; and if this system be permitted, the knell of photography is sounded.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

On a simple Process for the immediate production of strong, positive Photographs by the employment of Salts of Iron. By F. Zöllner.

M. Nièpce de Saint Victor has recently published a process*, by which photographs are obtained by the employment of nitrate of uranium, which are developed by treatment with nitrate of silver. For this purpose a leaf of paper is soaked with a solution of nitrate of uranium, covered, after desiccation, with the negative picture to be copied, and then exposed for about a quarter of an hour to direct sunlight. If the exposed paper be then laid in a solution of nitrate of silver, a positive picture of a brownish-red colour, and remarkable for its sharpness and distinctness, makes its appearance. Some time later (on the 29th of April, 1858), Magnus communicated to the Berlin Academy some improvements in the process just described, which had been invented by O. Hagen. These improvements are as follows:—

1. Unsized paper must be employed, or sized paper must be freed from its size by boiling water.

2. The salt of uranium must contain no free nitric acid, and must not be contaminated by the impurities of the commercial salt, such as copper and arsenic.

3. The aqueous solution of silver is mixed with some alcohol or ether.

By observing these rules Hagen succeeded in obtaining pictures of a greyish-black tint, which require an exposure of 30, or at the utmost 60 seconds, and on blotting-paper only 15 seconds.

Taking into consideration the points just mentioned, Hagen gives a theory of the chemical process occurring in this case, and brings it into connexion with the peculiarity of the alcoholic solutions of pernitrate of uranium, which, when exposed to the light of the sun, become reduced to protonitrate. In order to establish this theoretical view, I undertook an investigation on this subject, by which I have been led to results which, besides their scientific interest, are, I think, not without importance for practical photography and its more general diffusion.

My first object was to render visible the process of reduction of the pernitrate of uranium which takes place in the light, and for this purpose to combine the liberated oxygen with a body by the oxidation of which a distinct coloration might be produced on those parts of the paper on which the light had exerted its reducing action. Such a body was furnished by starch-paste and iodide of potassium; I accordingly laid the paper, soaked in pernitrate of uranium and afterwards dried, upon a diluted solution of starch-paste in which small quantities of iodide of potassium had been dissolved, and exposed the paper thus prepared, when dry, to the direct light of the sun. Within a few seconds the paper itself began to grow perceptibly blue, and in ten minutes it had acquired a deep bluish-grey colour with somewhat of a violet tinge, so that even on the first repetition of this experiment, in which the paper was covered with opake writing upon transparent paper, I obtained an accurate and distinct copy of the writing in white upon a blue ground. The sensitiveness was apparently a little increased when the solution of pernitrate of uranium was mixed with pure starch-paste. To fix the picture, all that is necessary is to wash it sufficiently with distilled water, when the colour becomes far more distinct, and at the same time acquires a bluer tint.

If it follows from the experiment just described that an evolution of oxygen is really produced by the action of light upon the uranium paper, so that the view set up by Hagen is confirmed, still all the circumstances above referred to, which increase the sensitiveness of the paper in Nièpce's process, must be diminished by the treatment of the uranium paper with iodide of potassium and starch-paste, as in this case the object is to employ all disposable oxygen entirely in the decomposition of the iodide of potassium. In fact my success, even with pictures on bibulous paper, was extremely imperfect, and the presence of small quantities of free acid proved to have no perceptible influence upon the sensitiveness of the paper.

With the object of continuing my investigations in the same way on salts of iron, the decomposability of which by light was already well known*, I treated a paper prepared with perchloride of iron with solution of iodide of potassium, and observed on all parts which had been in contact with this solution a deep blue-black coloration of the paper in consequence of the separation of iodine. If, on the other hand, the paper coated with perchloride of iron had been exposed for a sufficiently long time to the light, it lost the property of be-

* Comptes Rendus, vol. xlvi. pp. 452, 489.

* Gmelin, Handbuch der Chemie, 1843, p. 164: Draper, Phil. Mag. Sept. 1857.

coming black by contact with solution of iodide of potassium. Paper prepared with sulphocyanide of iron behaved in exactly the same way; and thus it became possible to produce *directly positive* photographs by the employment of certain salts of iron and iodide of potassium.

From the reaction just described, all compounds of peroxide of iron with organic acids investigated by me formed an exception. But if a certain quantity of a solution of peroxalate of iron be mixed with a solution of perchloride of iron, a mixture is obtained which is very much more sensitive than perchloride of iron alone. Whilst paper soaked with the latter is only decolorized in the sun in from 15 to 20 minutes, this takes place with a paper prepared with the above-mentioned mixture within 2 minutes. This property of increasing so considerably the sensitiveness of the solution of perchloride of iron appertains, however, only to peroxalate of iron among all the organic compounds of iron investigated by me.

I may now be permitted to give a short account of the process of preparing photographic copies upon the above principles, which after many experiments has proved to be the best and simplest.

A mixture was prepared of 1 vol. of concentrated solution of perchloride of iron, 6 vols. of a concentrated solution of peroxalate of iron*, and 14 vols. of distilled water. Upon this mixture a paper sized with starch † is allowed to float in a dark place for thirty to sixty seconds, and then hung up to dry. The paper, when perfectly dry, has a faint yellow colour; it is covered, on the prepared side, by the object to be copied, and exposed to the light in a photographic copying frame. In the full light of the sun a complete decolorization on all the uncovered parts takes place in less than 3 minutes, and the copy is then completed. In order to bring out strongly the parts not acted upon by the light, the paper is washed over with a solution of iodide of potassium in albumen (2 to 3 grms. of iodide of potassium to the whites of three eggs), and then the whole picture is sufficiently washed on both sides with ordinary water, and dried between blotting-paper. The employment of albumen for the solution of the iodide of potassium is very essential, as on all the dark parts of the picture the albumen is probably converted into its insoluble modification by the separation of iodine, and thus the washing out of the outlines during the treatment with water is avoided. Hence the lustre on all the dark spots. During the washing of the pictures a change in the tint from brownish to bluish black is observed.

I have hitherto endeavoured in vain to increase the sensitiveness of this paper in order to employ it in the camera obscura. I have, however, succeeded in producing negative pictures in the camera in a comparatively short time, upon paper soaked with a concentrated solution of bichromate of potash*, but these have too little intensity to permit positive copies to be made from them. These pictures are also rendered visible by solution of iodide of potassium to which a trace of dilute sulphuric acid has been added. The sensitiveness of this paper prepared with bichromate of potash is, however, so extraordinarily great, that a strip of it partially covered and held at a distance of 2 inches from the flame of an argand lamp, exhibits a distinct action of light upon the uncovered parts within 2 minutes.

Besides the great simplicity and cheapness of the process above described, the following circumstances deserve notice:—

1. As far as observation goes at present, the paper may conveniently be prepared eight to fourteen days before it is used, and may be preserved in the dark without losing any of its usefulness. With regard to the solution of iron, I may remark that a mixture prepared three months ago and preserved in a dark place is still perfectly effective†.

2. The development of the picture may be put off for twelve hours after exposure, without any injury to the distinctness of the picture. When a longer interval is allowed to elapse, a fresh oxidation of the parts deoxidized in the light gradually takes place.

3. The experiments made as to the permanence of these photographs have hitherto been completely in favour of the process. I exposed some of them uninterruptedly for several days to daylight and sunlight, and after five hours' illumination by direct sunlight only observed a change of tint from blue-black to brownish black, but the pictures did not lose in intensity. As a matter of course, this point can only be definitively settled by time.

The numerous copies of dried plants, copper plates, and some manuscripts which I have prepared by this method, are remarkable for their sharpness and the intensity of their colour.

I have referred to the rather voluminous

* The peroxalate of iron was prepared by dissolving the hydrated peroxide of iron precipitated by ammonia from a solution of perchloride of iron in a concentrated solution of oxalic acid in a dark place. The sensitiveness is increased by a little free acid.

† The best paper is that occurring in commerce under the name of "Negative photographic paper," with the water-mark "De Canson frères."

* Cosmos, vol. viii. pp. 7-11; Bull. de la Soc. d'Enc. October 1857, p. 598.

† See Draper, Phil. Mag. Sept. 1857.

literature of photography without the employment of silver salts up to the end of last year. Except some remarks by Nièpce de Saint-Victor upon the reaction of a concentrated solution of iodide of potassium upon paper exposed to the light of the sun*, the only thing requiring notice is a memoir by Roussieu†, which in some respects resembles the process above described. Roussieu's process is as follows:—

If a piece of paper be soaked with solution of acetate of lead, and put, when dry, into a solution of iodide of potassium, yellow iodide of lead is precipitated upon its surface. This has the property of very rapidly acquiring an olive-green colour when exposed to the light in the presence of starch; this, according to Roussieu, is produced from the violet of the iodide of starch, and the yellow of the unaltered iodide of lead. The author availed himself of this property of iodide of lead, by coating paper with a mixture of iodide of lead and starch-paste, to make photographic copies of lace, feathers, leaves, &c. It is evident that negative pictures alone can be obtained by this process; and as these have very little intensity, both according to Roussieu's express observations and my experiments, we must give up the idea of preparing positive impressions by this process.

The experiments above referred to, upon the permanence of the photographs described, were made in the winter months, and consequently at a period of the year very unfavourable for such purposes. Their repetition in the last weeks of May has shown, that such photographs, when exposed in a copying frame to the direct rays of the sun, falling upon them as perpendicularly as possible, not only change their colour, as above remarked, but also lose in intensity. This change, however, appears to be due less to the action of light, than to the very considerable elevation of temperature produced by insolation in a copying frame, as similar photographic impressions simply suspended in the sunlight exhibited far less alterability. But when the same impressions were heated until the paper was scorched, the copy upon it disappeared a little before the destruction of the paper commenced. The same thing takes place when the copies are treated with alkalies. Although therefore the circumstances under which the above photographs are destroyed are in general abnormal in their nature, it is nevertheless of the highest interest for their preservability that Payen‡ has succeeded, by the simple treatment of starch with oxide of copper and ammonia, in protecting the colour of iodide of starch from the action of light and heat.

It is, however, to be observed, that both in persistence against the above-mentioned agents and in the tint, there is considerable variation in the different impressions, although I could never succeed in ascertaining with the precision which would be desirable, the conditions under which these phenomena are most advantageously produced. Nevertheless the gradual improvement of photography in general up to its present high state of development has shown that such conditions, from the complete absence of any positive knowledge of the molecular processes which take place, can only be discovered in a purely empirical way by repeating the processes as frequently as possible and under every possible variation, and therefore that it is only by this means that an improvement of the process above described is to be expected.

* Comptes Rendus, Nov. 1858, No. 22.
† Ann. de Chim. tome xlvii. pp. 154–163.
‡ Comptes Rendus, tome xlviii. (1859), p. 73.

THE ECLIPSE OF THE SUN.

In the belief that an account of the proceedings of the several parties composing the Himalaya Expedition to Spain may have some interest for the general reader, I venture to address to you the following summary of the observations made at Rivabellosa, a village near Miranda del Ebro.

The station selected was a threshing-floor, situated in latitude 42 deg. 42 min. north, and longitude 11 min. 38 sec. west, at the height of 1572 feet above the mean level of the sea. The magnetic variation was found to be 20 deg. 20 min. west. The locality, being bounded by a beautiful panorama formed by the distant Pyrenean range, was well situated for observing the effect of the eclipse on the landscape.

My party consisted, besides myself, of Mr. R. Beckley, the mechanical assistant at Kew, Mr. Downes, Mr. E. Beck, and Mr. Reynolds. Mr. Clark, who, at Mr. Vignoles's suggestion, had acted as our interpreter, also volunteered his services, which proved most valuable during the eclipse. Each of my assistants had allotted to him a separate duty, and to their cheerful concurrence in carrying out my wishes must be attributed the successful result obtained.

My more important object was to endeavour to obtain photographs of the various phases of the eclipse by means of the Kew photoheliograph, an instrument I designed, at the suggestion of Sir John Herschel, for the special object of delineating the sun's image by means of photography. Although this was the primary

object, I had also provided myself with ample means of observing the eclipse optically.

Our instruments and portable observatory, weighing very little short of two tons, were by previous arrangement conveyed in two days to my station by the kindness of Mr. Vignoles, to whom my thanks are especially due, and also to Mr. Bartlett, of the firm of Messrs. Brassey and Co., contractors of the Bilboa and Tudela Railway.

By the 12th of July we had erected the observatory, and by the 14th had obtained the first solar photograph in Spain. During these preliminary observations photographs were made of the surrounding panorama by Mr. Downes, and the geographical position of the station ascertained by myself.

The climate proved to be most uncertain; and much serious interruption was experienced by the clouds, which frequently completely obscured the sun for the whole day. Much inconvenience was also experienced from the dust, which rendered it necessary to obtain large supplies of water, in addition to that required for actual use, in order to keep the station moistened; otherwise this enemy to photography would have prevented any good result from being obtained.

The Kew photoheliograph consists of a tube having the form of a truncated pyramid, at the smaller (upper) end of which is fixed the object-glass, $3\frac{4}{10}$ths inches in diameter, and 50 inches focal length. The focal image of the sun formed by the object-glass is $\frac{47}{100}$ths of an inch in diameter, but, before it is allowed to fall on the sensitive plate, it is enlarged, by means of a secondary combination of lenses, to 4 inches in diameter.

The sensitive plates, 6 inches square, are placed at the large end of the pyramidal tube of the telescope. The tube is what is termed equatorially mounted, and is made to follow the diurnal motion of the sun by means of clockwork.

In taking pictures of the sun the aperture of the object-glass is usually reduced by means of stops to 2 inches.

Even with this small aperture the duration of the exposure of the sensitive plate to the action of the sun is a very small fraction of a second of time. The exposure of the plate to the sun's action is effected by means of a sliding plate, having a very narrow slit in it. The plate, which moves in the plane of the primary focus of the telescope, is drawn downwards by means of an opening, and, previous to taking photographs, is held up by a loop of thread fastened to a hook.

When a picture is required to be taken the thread is set on fire, and the plate flashes instantly across the axis of the telescope, and allows the image of the sun to pass momentarily through the slit on to the sensitive plate.

The clockwork driving apparatus, although convenient, might actually be dispensed with in taking sun-pictures under ordinary circumstances; but at the period of totality in a solar eclipse it is necessary to expose the sensitive plate for some time to the more feeble light of the luminous prominences and corona, and then a clockwork driving apparatus becomes essential; and it is also necessary to employ the full aperture of the telescope.

The photoheliograph is provided with position wires, which may be removed at will; when left in the tube, they become depicted as dark lines crossing the sun's disc whenever a sun-picture is taken, and serve to determine with great accuracy the position of any markings on the sun or of the cusps with reference to a normal line; for instance, with a circle of declination.

The day previous to the eclipse was completely overcast, and the barometer was steadily falling. Nevertheless four dozen plates were cleaned, so as to be in readiness for the morrow; but the 18th proved in the morning to be as cloudy as its predecessor, and it was with very faint hopes that we went to our station. At 12 o'clock the sky began to clear, and we obtained a faint picture of the sun through the clouds; about half-past 12 the clouds melted away as if by magic, and we had a clear blue sky (without a cloud visible), except on the distant mountains.

About 200 persons, who seemed to think that the eclipse was only to be seen from our station, rather interfered with our operations by their conversation, which completely prevented our hearing the beats of the chronometer; but the majority were persuaded after a little while to go on a neighbouring height; and the Alcalde Civilo Guinea, to whom I wish publicly to tender my thanks, and the Civic Guards induced the remainder to speak in a lower tone.

Just before and after the eclipse, sun-pictures were made, and during the progress of the eclipse thirty-one photographs were obtained, the times of which are carefully registered. These will serve hereafter to determine the path of the moon across the sun's disc and other data with considerable accuracy.

The serrated edge of the moon is perfectly depicted in all the photographs, and in some of them one cusp of the sun may be seen blunted by the projections of a lunar mountain, while the other remains perfectly sharp. I continued during the eclipse to observe the sun by means of a telescope of 3 inches' aperture, by Dallmeyer, and I am enabled to confirm the

results obtained photographically. As I observed the progress of the eclipse, I gave the signal from time to time for the taking of a photograph, so that some have been procured just as the moon passed across any conspicuous solar spot.

When the sun was reduced to a small crescent, the shadows of all objects were depicted with wonderful sharpness and blackness; and as I cast my eyes on the now silent crowd, they and the landscape appeared as if illuminated by the electric light, so brilliant were the lights, so sharp and black were the shadows.

The sky began to assume an indigo tint, and the landscape to be tinged with a bronze hue. But a few moments, however, could be spared for these observations; and when I placed my eye again to the telescope, and removed the dark glass some minutes before the totality, I distinctly saw the whole of the lunar disc, and perceived a luminous prominence on the east of the zenith. This was quite visible while the sun's image was reflected by a glass surface fixed at an angle of 45° in the eyepiece, and its intensity therefore much diminished. The upper surface of the glass diagonal reflector I had, however, silvered to the extent of one-half, and as I brought into action the silvered half just previous to totality, I perceived a large sheet of prominences on the east. A little to the east of the zenith a brilliant cloud, quite detached from the sun, and at some distance from the moon, came into view. A few degrees to the west of the zenith a minute point was perceived at the commencement of the totality. South of the vertical only one small prominence was perceived.

The brilliancy of these prominences far exceeded that of the corona. Much detail was visible in the protuberances, both of light and shadow and configuration. No appearance of Baily's beads was seen.

Casting the eye for a few seconds away from the telescope to behold the corona and the surrounding landscape, I was much surprised to find that the darkness was not so intense as I had anticipated.

The deep indigo of the upper part of the sky shading through a sepia tint into red and orange as it approached the horizon, the deep blue of the mountains as contrasted with the orange sky, and the peculiar light cast on the spectator, impressed me with a feeling of solemnity never to be effaced, and which was enhanced by my ear catching the sound of the village bells, which it appears had been tolled during the eclipse. I saw two stars to the east of the sun, which I believe to have been Jupiter and Venus, and observed that the corona did not extend generally more than about $\frac{8}{10}$ths of the diameter of the moon beyond her limb, but that there were outlying rays of greater extent. A thought of my other duties recalled me, after a few seconds' gaze, from this enchanting scene, and I did not attempt any exact observations of the corona.

To return to photography: when the disc of the sun had diminished to a small crescent, I gave the signal to discontinue the ordinary pictures, and to take away the stop of the object-glass in order to have the full aperture ready for the totality; and the instantaneous apparatus was also disconnected. The signal to prepare plates for the totality was also made; and three plates, by a preconcerted arrangement, were coated and then sensitized in an extremely sensitive neutral bath, which I had prepared expressly for the purpose. As I could collect no reliable data as to the intensity of the light of the luminous prominences and corona previous to the expedition, I was working under great disadvantages; and I confess, from all that I could learn previously, I had very faint hopes of depicting the corona at all; and I was led to think, from the colour of the prominences, that if I did get a picture of the corona, my only hope was to get the prominences as dark markings on the supposed more brilliant corona. Although my own observations during the totality gave me greater hopes of success, it was with a thrill of pleasure that, in answer to my questions, I learnt from Mr. Reynolds that the picture was coming out under the influence of the developing fluid.

This first plate had been exposed by previous arrangement just one minute, and only time enough remained for a second plate to be placed in the telescope.

Just at this period the wind rose, and shook the observatory and telescope violently. Had it been possible for me to have known beforehand how intense the light of the prominences really was, there would have been no difficulty in obtaining the photographs in much less time: and I do not doubt that four might have been procured with an exposure of from 20 to 30 seconds each.

Previously to leaving London, trials had been made to obtain photographs of the moon with the Kew instrument, merely, however, for the purpose of judging of the time that might be necessary for the pictures of the corona, supposing it to be as bright as the moon; but not the slightest impression could be obtained by an exposure of one minute, whereas the pictures we have obtained of the luminous protuberances are all over-exposed, and the corona has clearly shown itself, so that the latter must be brighter than the light of the full moon.

The plates being only 6 inches square, while

the sun's image is 4 inches in diameter, it will be seen that only a small extent of the corona could be depicted. I mention this in order that there may be no misconception on this point: had I desired to make photographs of the whole of the corona, I should have adopted a totally different arrangement.

My hand drawings were made by the aid of a series of lines ruled on glass, and placed in the focus of the eyepiece. This could be rotated through an arc of 90 degrees, and I had two diagrams with similar lines set out on my drawing paper. With these aids I was able rapidly to make some measurements of position and extent of the prominences, and to complete two drawings. On comparing my sketches with the photographs, I was pleased to find that each completely confirmed the accuracy of the other.

My drawings were made in reference to the vertex; but it will be better to describe the markings as they were shown in the photographs in relation to a circle of declination. If the reader will suppose a circle to be divided into four quadrants by drawing two diameters across its centre at right angles, and that one of these diameters is made to coincide with a line drawn through the centre of the sun and the pole, calling the quadrants north-east, south-east, south-west, and north-west respectively, then the edge of the moon, both in the north-east and south-east quadrants, was at the commencement of totality nearly covered with the luminous prominences, which extended over an arc of 130 degrees beyond her dark limb. These prominences were extremely brilliant, and far more so than the corona; they were not uniform in tint, and, with few exceptions, they did not present any colour approaching to red or rose; two had, however, a decided but faint rose tint. The surface of the luminous prominences next to the moon was, when first seen, very irregular, and far more so than was attributable to mountains as seen in profile on the moon's edge. This irregular outline may, however, be explained by supposing the prominences to have been first seen floating like clouds in a transparent atmosphere at some little distance from the sun's surface, and consequently from the moon's edge—a supposition which is supported by the fact that one such prominence or luminous cloud was seen distinctly detached, and at some distance from the dark moon.

At the commencement of the eclipse only one small mountain-like peak was to be seen in the north-west quadrant, and a curved one in the south-west quadrant. As the moon glided over the sun's disc, the inner outline of the prominences in the eastern hemisphere became less and less indented, and at last they were bounded by the nearly even outline of the moon's limb. As the eastern prominences became gradually covered, the mountain-like peak, seen at first as a mere point in the north-west quadrant, gradually grew in dimensions, then presented several points, and at last resembled somewhat a colossal ship in full sail; and extending from this through an arc of 60 degrees, there came into view, in the north-west quadrant, a long streak of luminous prominences, varying in breadth and with a few points projecting outwards. This streak became very jagged in its inner outline as the moon glided off from it, just previous to the sun's reappearance—these luminous prominences presenting the same phenomena as those on the eastern edge; that is, appearing like clouds floating in a transparent atmosphere a little distance from the sun.

It will render the detailed description I now propose to give of the several luminous protuberances, as measured in the photographs, more clear, if the reader will provide himself with a circle divided into 360 degrees, and number the degrees in the reverse order of the figures on a watch—namely, from right to left.

Placing 360, which represents the north point (not the vertex), uppermost, the east point, or 90 degrees, will be at the left; 180 degrees, or the south point, at the bottom; and 270 degrees, the west point, at the right hand. Eastward from the north point there was conspicuously visible a brilliant prominence, the summit of which, as the moon glided along, was seen to curve in two opposite directions from a radial line, the curved portions being far less brilliant than the stem, which touched the moon's limb throughout the totality. The centre of the stem was 28 degrees from the north point, and it was about 1 minute of arc broad (28,000 miles nearly). It extended fully 1½ minute, or 42,000 miles beyond the moon's limb. This protuberance was so brilliant that I perceived it several minutes before the totality, and it must, without doubt, have been seen by all observers provided with good telescopes. It may therefore be conveniently made a starting-point to which all protuberances of which I shall speak may be referred by those astronomers who observed the prominences in regard to the vertex, by taking into account the angular distances of the several prominences from this one.

At 57 degrees was situated the northern extremity of a remarkable detached curved cloud, which, when first seen, was about half a minute (14,000 miles) beyond the position occupied by the moon's dark limb. It presented a double curvature on its northern side, both curvatures being convex towards the north. It inclined

in a curved direction at about an angle of 60 degrees from a radius towards the east, and was a minute and a half (42,000 miles) long. As the moon glided onwards in her course she approached it gradually, and at last touched the extreme point of this floating cloud, which glowed with all the brilliancy of one of our own terrestrial clouds at sunset. It presented a decided rose tint.

At 72 degrees from the north a protuberance, in shape reminding one of a boomerang, imprinted itself on the sensitive plate, although it was not visible to me in the telescope. The stem was 2 minutes long (56,000 miles); the point was bent towards the north, inclining downwards over towards the extremity of the detached cloud. Midway down the stem was a branch curving upwards, so that, on close scrutiny, the boomerang protuberance was not unlike the capital letter G in ordinary writing. It is a very curious circumstance that this protuberance imprinted itself distinctly, although it did not attract the eye directed especially to that locality. This may be accounted for on the supposition that it emitted a feeble purple light.

Between the last-named protuberances (the floating cloud and the boomerang) there was a low and long luminous streak, not more than a quarter of a minute broad, and extending in length about 8 degrees along the moon's limb.

From the stem of the boomerang, extending from 72 to 135 degrees, there was a long streak of luminous cloud, commencing with the thinnest possible streak near the boomerang, and then becoming broader, but in no part exceeding a quarter of a minute in breadth, until it reached the position of 111 degrees, when a skittle-like thickening took place, half a minute broad in the broadest part. Projecting from the commencement of this skittle were some faint projections, which imprinted themselves on the sensitive plate, but I did not see them in the telescope. From 120 degrees to 135 degrees there was a considerable enlargement of the streak, which widened out to fully one minute in breadth (28,000 miles). This was bounded by curved lines, and was extremely brilliant. Just in the neighbourhood of this thickening—namely, between 115 degrees and 140 degrees—the corona was very bright, and one of the long streamers was to be seen curving towards the north.

At 154 degrees a protuberance, curving northwards, and not unlike a bishop's mitre, existed, which extended from the moon's limb a distance of 1·5 minute (42,000 miles); it was very much fainter towards the point than near the stem. A very faint streak of light connected the mitre-like protuberance with the long streak.

The long streak, and nearly all the mitre-shaped protuberance, were covered by the moon before the totality ended, but the floating cloud and the first-named northern protuberance were visible during the whole time.

At the commencement of the totality only two protuberances were visible in the western half of the moon's disc—namely, following the order of the preceding description, one, the centre of which was situated at 194 degrees, consisted of a thin streak less than a quarter of a minute broad, and extended over an arc of 5½ degrees on the moon's limb; at 197 degrees, a point curving towards the south projected about ½ min. This projection was completely covered as the moon advanced. The other projection was the mountain-like peak, the centre of which was situated at 348 degrees. This peak, at first not more than ¼ min. high, grew to considerable dimensions as the moon glided away from it, and assumed, as was before said, the appearance of a ship in full sail, the summit, or mainmast, extending more than 1½ min., and the case or hull of the vessel measuring 10 degrees on the moon's limb.

As the moon glided on there came into view a long streak extending from 280 degrees to 340 degrees, where it just touched the hull of the ship. This streak was in some parts a mere line, and bounded by curved lines both on the under and upper side. It thickened to about ¼ min. between 300 degrees and 310 degrees, at both of which places two short horn-like projections were to be seen.

At 263 degrees and 278 degrees there came into view two small projections, one extending ½ min., and the second ¼ min. from the moon's disc.

Warren De la Rue.

How the Eclipse was taken by the Astronomers in America.

[From the American Journal of Photography.]

The morning sun of yesterday rose veiled in haze, which it threw off as it ascended the heavens; then appeared, overspreading the sky, drifts of gauzy clouds, which the gathering heat soon dissipated, so that when the eclipse began, the atmosphere was beautifully clear.

The scene at Mr. Rutherford's Observatory, corner of Second Avenue and Eleventh Street, was interesting. Mr. R. and Dr. Hackley, Professor of Astronomy in Columbia College, were early at hand, with several assistants, and watched the eclipse throughout its progress.

As the time given by the astronomical tables approached, Mr. Rutherford took his position at the great equatorial, mounted on a platform, to watch for the instant of appulse of the limb of

the moon upon the sun's edge. Nearly the whole of the sun's light was cut off by means of a screen of pasteboard, having an aperture of but 2 inches, placed upon the object-glass; and the intensity of the light that still streamed down through the tube was tempered to the eye by dark-coloured circles of glass.

As the critical moment drew near, every tongue was silent, and nothing was audible but the slow, heavy tick! tick! of the chronometer clock, beating seconds, and the quicker te-rick-ah! te-rick-ah! of the beautiful clock-work attached to the great equatorial, and which keeps the object under examination steadily in the field of view. There were three chronometers in use. Now every man is at his post, and all is still. An indiscreet question by a visitor breaks the silence, but the person addressed gives no heed. All watch the lapse of seconds with bated breath. "Twenty!" "half!"—"one!" "half!"—"two!" "half!" counts each time-keeper, with eye riveted on the chronometer before him; and round and round goes the nervous little seconds-hand, beating out time with a quick firm jerk. "Three!" "half!"—"four!" "half!"—"five!" "half!"

"Time!" shouted the observer.

I have it: 25·5 seconds, 56 minutes, 2 hours—sidereal time at Greenwich, by the chronometer clock, and the serrated limb of the moon has entered the perfect edge of the sun's disc. Marvel of science! Who understands, if not the mathematician, that figures do not lie? Not merely one little day or year in advance does the astronomer announce his prediction of these epochs, but for centuries to come he forewarns the watchman of the skies of the precise place and instant of each interesting phenomenon.

"I never saw a sharper or clearer entrance," observed Mr. Rutherford spiritedly, and with evident enjoyment of the auspicious event, as he stepped upon the floor and went out. There was a feeling of satisfaction apparent on every face. "What a beautiful atmosphere!" said the Professor, with real zest; "how clear and steady!"

The thermometer is now consulted—68°·5 F., it says. Then follows a comparison of notes, and all are ready again for the next event.

Mr. Rutherford enters, bringing a wooden frame, perhaps 10 inches square, dripping, as with water. He mounts the stand, and slides the frame into a camera box, which had been adjusted to the tube of the equatorial before the eclipse began. The smaller aperture, of perhaps half an inch in diameter, in the neck of the camera box, which admits the rays of the sun upon the plate, is yet closed by a slide. This slide has an aperture in the middle of it corresponding to the aperture in the box. It plays upon a pivot, and a spring is fitted to it. A touch liberates the spring, and the slide flies across the aperture, giving passage to the solar beams and cutting them off instantaneously.

Mr. R. gives warning of readiness, and all are again on the *qui vive*. "Ready!" he cries, without a particle of unsteady excitement. "Fifty-eight!" "half!"—"nine!" "half!"—"sixty!" "half!"—"one!" "half!"

"Click!" The slide has sprung! The picture is taken! The sun and moon are photographed, touching hands at their nuptials.

1·5s. 8m. 3h. sidereal time at Greenwich. There is manifest interest in every face, but no agitation, no flurry, and the calmest of all is the chief operator himself.

Another look at the thermometer—69°·5.

"What a beautiful group of spots!" exclaims the Professor, gazing through the "finder" of the great telescope. "We must have the immersion of them! Ready for time!"

All stand at their posts, and repeat the minutes as the strong tick of the clock sounds them out in stillness. Seconds grow to minutes, and minute succeeds to minute, as the uneven limb of the moon slowly moves, under the steady gaze of the Professor, toward the interesting object. "Time!" 22s. 14m. 3h. "Appulse of largest outlier of group of spots," the Professor announces loudly. "Ready again! Time!" 39s. 15m. 3h. "Contact with penumbra of large spot." "Ready again! Time!" 39s. 15m. 3h. "Contact of nucleus of ditto."

Mr. Rutherford here re-enters with a second photographic plate, and the order proceeds as before—another and another till ten pictures are taken.

As the eclipse wears toward its end, Mr. R. rests satisfied. The camera box is removed, the beautiful eyepiece fitted on, and a screen with larger aperture than had been used in taking the photographs fitted to the object-glass. After some few general observations through the glass, attention is once more summoned, and all stand ready again to record the instant when "time" is called—the emersion. * * * * Slowly the minutes go. * * * Round and round once, twice, moves the small nervous finger of the seconds. * * * Slowly, slowly. * * * The interest is great; the silence audible. * * *

"Time!" 27·25s. 57m. 4h., and the eclipse is over!

There now remains to "reduce" the time given by chronometers to "mean time" for the place of observation—if such technical phrases may be allowed without explanation—and the record of the solar eclipse at this observatory is complete.

The thermometric records made during the progress of the eclipse exhibit the interesting fact that during the first half of the eclipse the mercury rose about one degree, during the last half four degrees, and during the nineteen minutes succeeding one degree.

On a mode of employing Instantaneous Photography as a means for the accurate Determination of the Path and Velocity of a Shooting Star, with a view to the Determination of its Orbit. By Jonathan H. Lane.

[From Silliman's Journal for July 1860.]

A tolerably accurate knowledge of the orbits of those meteors, or shooting stars, which may enter our atmosphere would be of very high value in the settlement of certain questions as to their origin. Hitherto this knowledge has appeared unattainable, by reason of the difficulty of effecting sufficiently precise observations of the meteor in the transient period of its visible flight, especially considering how this difficulty is aggravated on account of the retardation of its motion by the resistance of the atmosphere. Recently, however, a method has occurred to me of applying instantaneous photography, so as to show accurately, not only the track of the meteor, but the division of its track into many equal and known fractions of time. If this can be successfully accomplished, we should have the data for ascertaining the velocity of the meteor at each point of the recorded part of its track, and the rate or law of variation of the velocity, and thence, with probably a good degree of accuracy, the velocity it had beyond the limits of the atmosphere; and the like remark may be made concerning the direction of the motion, should that be found subject to change.

The basis of the proposed process, as already intimated, is the extraordinary advances that have been made within a few years in the preparation of the sensitized surfaces of photographic plates, whereby artists are enabled to produce good pictures by an exposure of a very small fraction of a second—so small as to afford a tolerable definition of objects in motion, such as sailing vessels. This holds out encouragement for a hope, at least, that a passing meteor would leave a visible trace on a plate so prepared, or, even if that degree of sensitiveness has not yet been reached, that it will be hereafter. I need therefore make no apology for placing the suggestion on record previous to direct experiment on this point.

In the first place, simple exposure in a camera, at a given station, would give the apparent track of a meteor as seen by the observer at that station, and a pair of such records made in two cameras at two stations, would give the track in absolute space. In the second place, if one of the two cameras were furnished with a mechanism by which equidistant points of time should be marked upon the trace made in that camera, these points could be referred to the real path in space; and if both cameras were in like manner furnished, the two records would, to that extent, be a check upon each other, and serve to reduce the limits of probable error. The device for marking time is an application of the revolving glass prism, very similar to that described in my paper on a visual method of comparing time between distant stations, published in the January number of this Journal*. Immediately in front of the object-glass of the camera, a glass prism, of small angle and sufficient area to cover the entire aperture, is made to rotate at an accurately measured rate of say twenty-five revolutions per second. The prism may be replaced by an excentric lens, or the object-glass itself may revolve on a slightly excentric axis. The consequence will be that the image of a fixed star in any part of the field of view will traverse the circumference of a circle every twenty-fifth of a second, and the image of a shooting star will combine this motion with its motion of translation. If the photographic surface retain a visible impression of the looped curve or the waved curve which will thus be produced, then, neglecting for the present the small effects of optical distortion, the line drawn midway between the two straight or regularly curved lines between which the looped or waved curve oscillates, will represent the apparent track of the meteor, and the points where it intersects the looped or waved curve, if they be translated along this middle line through a space equal to the optical displacement of the meteoric image, will show the apparent place occupied by the meteor at points of time separated by the equal intervals of one-fiftieth of a second. If the period be made too brief, the impression left by the head of the meteor in one sweep of the looped or waved curve might possibly be obliterated by the impression of the closely following parts of its train, while the head is traversing the subsequent sweeps of the curve. But there is no reason to anticipate from this cause any difficulty in obtaining a sufficiently short period to determine the law of variation of the velocity or direction.

In the above statement I have supposed only a single camera, but it will probably be impossible in this way to command a sufficient extent of the heavens. A system of many cameras may, however, be formed, so arranged that their several optic axes shall cross in a

* Silliman's Journal, vol. xxix. p. 43.

common point *in front* of the object-glasses. The object-glasses may thus be approximated as closely as we can desire, and the several revolving prisms, or excentric lenses, may have a common geared connexion, and the backs of the cameras will be readily accessible for the renewal of plates. When the track of a meteor, by reason of its extent or situation, is obtained in parts from different cameras of such a system, it is geometrically impossible, on account of the spherical excess, that the exact interval of one-fiftieth of a second between the times marked upon the meteor's track should, in general, be preserved in the transition from one plate to another in all situations of the track, or, in other words, that every two adjacent cameras in the system shall be capable of marking, in the manner described, the same common point of time upon the track of a meteor, but the exact difference in time can always be known.

In the execution of such a plan as this, two stations are to be selected at a suitable distance, and a system of cameras established at each, of such range that the two may cover in common a sufficient extent of the upper regions of the atmosphere to afford a fair chance for the occurrence of meteors. Each station will require at least an observer and a photographer. The photographer will renew the plates as often as their surfaces, either from time or exposure, become impaired, and will perform the manipulations required in fixing the impression when taken. The observer, after having made the necessary instrumental adjustments and determinations, will be charged with the sole duty of watching for meteors in the region covered by his system of cameras, and at the appearance of a meteor will touch a spring so contrived as to cause the instant unveiling of all the cameras of the system, and on the extinction of the meteor will promptly replace the screen.

The expense and trouble of this process will certainly be great, but will not be disproportioned to the importance of the object in view. Only let us have a photographic surface that will give a visible trace of the meteor's path, in the face of exposure to the light of the sky during the time of the meteor's visible flight, and then success, as regards the attainment of an accurate record, will be nearly certain, and we should not hesitate at the expense and trouble.

Nor does it seem to me that our success would be much less certain in respect to the reliable determination of the direction and velocity which the meteor had before entering the atmosphere, and consequently of the orbit in which it had moved. A very simple calculation, based upon the mechanical theory of heat, leads us to the conclusion that any body of a nature to become readily incandescent by heat, of such a thickness as half an inch, and not possessing a greater power of conducting heat through its mass than any we are acquainted with, must, on entering our atmosphere with planetary velocity, become self-luminous by the time that velocity has been reduced by some such fractional part as one thousandth. The *vis viva* of a body moving with a velocity of twenty miles a second is equivalent to the heat that would raise the temperature of an equal weight of water about 224,000° Fahr. With such a velocity so many times exceeding that of sound, the masses of air lying in the path of the body must be driven before it, and receive a velocity equal to that of the body, or at least to a large fractional part of it. The mass of air which the body must have encountered in losing the thousandth part of its velocity will, therefore, be of the order of a thousandth part of that of the body. With the loss of a thousandth part of the velocity, the loss of the body's own *vis viva* will correspond to the quantity of heat that would raise the temperature of its weight of water 448° Fahr. If, after making allowance for the motion communicated to the displaced air—approximately one half—and for the quantity of generated heat which this air retains and carries off, we assume that a twentieth part of the above 448° enters into the body itself, and by reason of the rapidity of its production is collected in a superficial coating of a hundredth part of its mass, and give this a specific heat within that of water, we should find an elevation of temperature of 2240° or upwards. The inference we would draw from these considerations seems confirmed by what we know of the great length of the visible flight of meteors, and of the great elevation of the region of atmosphere in which it occurs.

If, therefore, upon suitable trials made upon the fixed stars, and upon shooting stars themselves, we shall find ourselves in possession of sufficient photographic power, there is no reason why an organized system of observations should not be instituted. If the fact in regard to the retardation of a meteor's motion be as the foregoing considerations lead us to anticipate, the discussion of a collection of such records as we should obtain, of a large number of meteors, will be likely to afford us complete assurance on the subject, by pointing out certain laws of the resistances at different altitudes. A moderate degree of accuracy in the absolute determination of the orbits, except when they make a near approach to the para-

bola, will be sufficient to answer all the questions of interest that will be likely to arise upon which a knowledge of the orbits would have any bearing. Whether the November meteors, for instance, move through regions that would identify them with the Zodiacal light, according to the theory of the late Prof. Olmsted, is a question that would receive an absolute determination.

Fothergill Process equally adapted for large as for small plates. Modification which gives a film nearly as strong as the Taupenot process, and renders less skill and care necessary for certain and continuous success.

To the Editor of the Photographic Journal.

Sir,—In your last Journal I observe the following Editorial remarks in reply to a query from a correspondent as to which is the best *dry process*:—

"The Fothergill process seems to be highly successful in the hands of many, but it is especially adapted for the stereoscopic size, *on account of the difficulty which exists of keeping the film sufficiently adherent to the plates when that size is exceeded.*"

As they are likely, if allowed to pass unnoticed, to deter many from availing themselves of a dry process unsurpassed, if equalled, for the beauty of its results and possessing so many advantages, it is with much pleasure I can confidently state, that, though they may be applicable to some modifications of the process, they are not so to the one I have all along advocated (No. 1 of my Pamphlet, and which has appeared previously in your Journal), viz. the use of water for reducing bath on surface of sensitized plate in the proportion of one drachm for every $5\frac{1}{2}$ superficial square inches, and subsequent application of moderately strong albumen, &c.

Plates up to 10×8 and 12×10, and probably larger, have been regularly prepared by it; and the loss of a negative from non-adherence of film, when the precautions mentioned are attended to, and the ordinary care necessary for success in all photographic operations is used, has been a rare occurrence.

The following modification which I have been recommending the last few months, gives a film nearly as *strong* as that of a Taupenot prepared plate; it also possesses the further advantages of not materially losing sensitiveness even with the use of a large quantity of water for washing the sensitized plate previous to applying prepared albumen, and of the prepared plates being less liable to injury from extraneous causes from the sensitive compound not being on the surface of the film. As it has enabled those to practise the process successfully who previously were unable to do so by any of the other modifications, and may be of equal service to your querist and others who have not seen it, I send it, though it has appeared in another publication.

Coat moderately well-cleaned glasses—the usual extreme care in cleaning need not be taken—with dilute filtered albumen (prepared albumen 1 part, distilled water 6 parts), and *dry quickly* by holding near to a fire; if any albumen gets upon the back of the plate, carefully remove it; also remove dust from the albuminized surface with a flat camel's hair brush, and coat it with collodion (suited for the dry process); sensitize in a nearly neutral 35-grain bath. When sensitized, place it in a dish somewhat larger, containing sufficient distilled or filtered rain-water to well cover it; wash well by gently agitating the dish for a minute or two; and if required *for long keeping*, repeat the washing with one or two fresh quantities of water; then drain for a few seconds and coat with prepared albumen (full strength); again wash in one, two, or three lots of water; drain, dry and preserve with the precautions and in the manner I have directed for the ordinary Fothergill process.

The difficulty sometimes experienced of causing the dilute albumen to flow evenly and freely over the surface of the plate, particularly when the glass is very dry, may be avoided by passing over it a flat camel's hair brush dipped in the dilute albumen previous to pouring on the latter: the surplus dilute albumen should be returned into a filter and allowed to again pass through before being used: dust should be avoided as much as possible till the albumen surface is quite dry. A number of plates may be albuminized at once and stored for use, but it will be well before using to take the precaution of again holding them before the fire.

Exposure if anything slightly in excess of plates prepared as first mentioned, varying from about $\frac{3}{4}$ of a minute or a minute upwards for stereo size, single lens, Ross, and from about $3\frac{1}{2}$ or 4 minutes ditto ditto for 10×8.

Leamington. ALFRED KEENE.

Double convex Lenses for Photography.

To the Editor of the Photographic Journal.

12 Park Street, Stoke-upon-Trent,
July 30th, 1860.

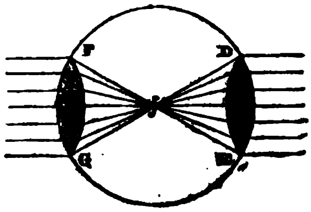
Sir,—Since writing to you respecting the result of my using the double convex lenses in pairs with great success, I have looked into an elementary work on Optics entitled "Legis's

Catechism," No. 15, published in the year 1825, and have been gratified to find myself in some measure borne out by his remarks.

From chapter 4, pages 19 and 21, I here subjoin (if such may be deemed worthy a place in your valuable publication) the following.

At page 19 is the annexed diagram.

Fig. 7.



At page 59 is the question No. 56, "What would be the consequence if there were nothing to receive the rays (fig. 7) at *f*? and if another glass, FG, of the same convexity as DE, be placed in the rays, at the same distance from the focus, what will be the result?"

And at page 21 the answer is given:—

"If there were nothing to receive the rays (fig. 7) at *f*, they would cross one another and diverge, in the same manner as they converge in coming to it; and if another glass, FG, of the same convexity as DE, be placed in the rays at the same distance from the focus, it will so refract them, that, after going out of it, they will be *parallel*, and so proceed on in the same manner as they came to the first glass."

The paper in your June Number "On the Nature of Distortion" (which to me is very interesting) may, I think, not inappropriately be supplemented by the extracts I now send you, and which you can use at pleasure if you think they will be of any service to your readers, as I find my first letter to you has produced one of inquiry sent to me from our sister Isle.

I may perhaps be allowed to state, that the work from which I have quoted, although in my possession from the time of publication, was never consulted in the construction of my different cameras, which were formed entirely from my own experiments, by the varied combinations of double convex lenses.

JOSEPH SMITH.

The recent Eclipse of the Sun.

To the Editor of the Photographic Journal.

Dover, August 7th, 1860.

SIR,—It will be remembered that in March 1858 a series of experiments were made with a view to discover, if possible, if the lunar surface were or were not surrounded by an atmosphere, by which a rational explanation of the various phenomena observed during solar eclipses might be offered, and also whether photography, which had already been employed since the introduction of collodion in the examination of the moon's surface, is not a proper means to investigate remote physical phenomena. At that time certain results were obtained which confirmed my previous opinion upon those subjects; but as it had been suggested that optical error may have occasioned them, it was determined, with a modified apparatus, to repeat those experiments during the next coming eclipse. This was done on the 21st of July last, and I have the satisfaction to state that what was originally produced has now been reproduced, the identity being complete.

I have not thought it worth while to go into lengthened particulars, the former communication having been so unfairly dealt with, but to state the simple fact for general information. Nor have I as yet learned whether those gentlemen whose ability qualifies them for the undertaking have succeeded in registering photographically the various phenomena attendant on such occasions; it may, however, be received as true, that photographers and astronomers have only to acquaint themselves with actinic differences, and, with appropriate means, photogenic agency presents them with an infallible element in physical research.

J. FEDARB.

Fothergill Process.

To the Editor of the Photographic Journal.

37 Great George Street, Westminster, S.W., July 1860.

SIR,—Being one of those who think that the greatest merit in a process is simplicity of working, provided, of course, that the results are satisfactory, I cannot help, at this season, when so many photographers will be on the wing, again calling the attention of all outdoor workers to the beautiful process of Mr. Fothergill.

In the spring of this year I published a method of working it, which in my hands has always yielded most satisfactory results. I am happy to say that further experience only confirms the opinion I expressed, that any one who will work as therein directed will meet with a more than average amount of success.

In opposition to many writers on the subject, I find that the actual quantity of water in which the plate should be washed after the silver bath is not material, provided that it be dipped sufficiently often to remove *all greasiness*. A small slipper-bath, about an inch deep, and large enough to hold a stereoscopic

plate, will contain water enough to wash six; after which, if more be prepared, a fresh quantity should be employed.

I *never* find it necessary to filter the albumen solution; I simply pour off the portion that settles, after beating to a froth, and use it at once.

But *it is absolutely necessary* that the washing after albuminizing should be *efficiently* performed. Four, or even six changes of water, well flooded over the plate, will not be found too much; and this extra trouble will be well expended if a clean picture is desired.

I still recommend the addition of the gallic acid solution after the washing.

Believing that many persons are deterred from following this simple and beautiful process from a fear of the supposed trouble involved in the preparation of the plates, I have been induced to trouble you with this communication. Robert W. Hall, F.L.S.

On the Preparation of Collodion.

To the Editor of the Photographic Journal.

Bagnères de Bigorre,
July 30th, 1860.

Sir,—I find that, by a slip of the pen, the proportions of the iodizing solution are not given in my formula for the preparation of collodion; they should have been as follows:—

Iodide of sodium	87	grains.
Iodide of cadmium	153	"
Bromide of cadmium	53	"
Alcohol of sp. gr. 800 or 810 ..	1	pint.

Will you be so good as to correct this error in your notices to correspondents in the next Number of the Journal, and, if necessary, in my original communication. The specific gravity of the sulphuric acid to be employed should be 1·84 instead of 1·60 as stated. Is it necessary that I should send a sample of my collodion to the Committee; and if so, how much will do?

F. Maxwell Lyte.

On the Means of Increasing the Angle of Binocular Instruments, in order to obtain a Stereoscopic Effect in proportion to their Magnifying Power. By A. Claudet, Esq., F.R.S.

[Abstract of a paper read before the British Association.]

In a paper on the stereoscope which Mr. Claudet read before the Society of Arts in the year 1852, alluding to the reduction of the stereoscopic effect produced by opera-glasses on account of their magnifying power, he stated that, in order to redress that defect, it would be necessary to increase the angle of the two perspectives. This he proposed to do by adapting to the object-glasses two sets of reflecting prisms, which, by the greater separation given to the two lines of perspectives, would reflect on the optic axes images taken at a greater angle than the angle of natural vision. Such was the instrument that Mr. Claudet now submitted to the British Association, to prove, as he has always endeavoured to demonstrate in various memoirs, that the binocular angle of stereoscopic pictures must be in proportion to the ultimate size of the pictures on the retina—larger than the natural angle when the images are magnified, and smaller when they are diminished; which, in fact, is nothing more than to give or restore to these images the natural angle at which the objects are seen when we approach them or recede from them. For magnifying or diminishing the size of objects is the same thing as approaching them or receding from them, and in these cases the angles of perspectives cannot be the same.

Mr. Claudet showed that, looking at the various rows of persons composing the audience with the opera-glass in its magnifying position, all the various rows appeared too close to one another, that there was not between them the space which separates them when we look with the eyes alone; and he showed also that, with the small end towards the object, the space appeared considerably exaggerated. But applying the sets of prisms to the opera-glass in order to increase the angle of the two perspectives, then looking at the audience as before, it appeared that the various rows of persons had between them the natural space expected for the size of the image or for the reduction of the distance of the objects. By applying the two sets of prisms before the eyes without the opera-glass, it was observed, as was to be expected, that the stereoscopic effect was considerably exaggerated, because the binocular angle was increased without magnifying the objects; but looking with the two sets of prisms alone at distant objects, the exaggeration of perspective did not produce an unpleasant effect. It appeared as if we were looking at a small model of the objects brought near the observer. For the same reason, stereoscopic pictures of distant objects (avoiding to include in them near objects) can be taken advantageously at a larger angle than the natural angle, in order to give them the relief of which they are deprived as much when we look at them with both eyes as when we look only with one eye; and instead of being a defect, it seems to be an improvement. In fact, the stereoscope gives us two eyes to see pictures of distant objects.

REVIEW.

Stereoscopic Illustrations of Clonmel and the surrounding country, | including Abbeys, Castles, and Scenery; with Descriptive Letterpress. By William Despard Hemphill, M.D.

Clonmel is a pretty and interesting Irish town, with a neighbourhood rich in historical associations, and charming from its natural beauties. Happy in many circumstances, it is also happy in having a resident physician, Dr. W. D. Hemphill, thoroughly alive to its attractions, and not too proud or exclusive to desire that the world should know of them, and, by means of photographic representation, share them. Hence this agreeable book, with the clever illustrations, of which a portion only are before us. Dr. Hemphill claims to be the first to have used stereoscopic views for the purposes of book illustration, claiming, in the most formal manner, the precedency of Prof. Piazzi Smyth, whose book on Teneriffe is probably known to all our readers. He also asserts that he was the first to open up the beauties of his own part of Ireland to the heliographic artist. These points we notice, as challenges to those whom they may appear to concern. Of the general merits of the views we can speak with authority; they are strictly Irish; some of them capital. Dr. Hemphill uses the wet process. As he says,—

"The accompanying photographs have all been taken by the wet collodion process, which, independently of its greater sensitiveness and the general superiority of its results, takes in the aggregate a much shorter time for its various manipulations than any other; and as negatives, however perfect, require the greatest care and experience in printing, to produce the best possible results, that part of the process has been entrusted to one of the most eminent photographic printers in London. Many persons complain that they find a difficulty in applying the stereoscope to illustrations bound in books. This, however, is wholly imaginary, as all the various forms of skeleton stereoscopes are well adapted for the purpose; and indeed any instrument with open end may be laid on the page, and by merely holding the book in such a position that the light will fall on the photograph, the view will be seen with as much ease and satisfaction as if mounted on cardboard in the usual way."

Clonmel from the Mountain, the Round Tower at Cashel, Holycross Abbey, Knocklofty Bridge, Lismore Castle, and the gradual rise of the Great Rock of Cashel, are all admirable specimens of photographic art. A good deal of letter-press accompanies the views, in which Dr. Hemphill describes with a delightful enthusiasm the hidden charms of each particular locality. Here is a taste of his quality as a literary artist:—

"Many of the antiquities, well known both to the tourist and the archæologist, have been much more ably and minutely described by others, although not so fully illustrated as by the unerring pencil of the sunbeam; while other relics, of importance to the student, have hitherto escaped notice, as well from the absence of historical records concerning them, as from the all but obliteration of the few remaining traces of their original architecture. But the exquisite landscape scenery abounding in the neighbourhood is comparatively little known to those who leave their homes every year in search of the new and beautiful. However, the small size of the present stereoscopic pictures, and the great difficulty of adequately representing by photography, at least in this variable climate, the effects of aërial perspective, and the more distant mountain scenery that gives such charms to the landscape, have necessitated the marked preponderance of architectural subjects in the present volume. The scenery of the Galtees and Comeragh Mountains will, however, well repay the visitor who may be induced to pass a few days in exploring their beauties, and will certainly suffer little, except perhaps in magnitude, by comparison with many more frequented and better known scenes. Who can behold unaffected with wonder and admiration the stupendous gorge encircled by

'Mountains that like giants stand,'

in which the gloomy waters of Cumshenaun Lake are overshadowed by a precipice of 1200 feet in height, so perpendicular that its naked surface of rock will not even give a footing to the wild goat! Standing under the shadow of this pre-adamite wall, with the huge mountains on either side, studded with

'The fragments of an earlier world,'

the solitude of Nature's savage desolation is most appalling. Views of this, as well as many other places well worthy of illustration, have been necessarily omitted for want of room."

Our Doctor seems to have enjoyed his work in the thorough manner of an artist and a lover of nature. No small part of the pleasure which he has himself enjoyed he manages to impart to his readers—the best test, perhaps, of success in art and literature.

Application of Photography as a Record of Military Operations.—Great diversity of opi-

nion has prevailed among military men as to the strength of the line of Martello Towers extending along the south-eastern coast. No. 71 having become unsafe from the encroachments of the sea, it was determined during the past week to bombard it with Armstrong guns. We witnessed some of the experiments, which extended over three days' duration, and were astonished to see the little effect produced by these powerful aids in modern warfare. It was not until nearly forty rounds were fired that a breach was effected, and this was accomplished by firing all the guns simultaneously. During the day photographs were taken and kept for official purposes, to complete which a heavy photographic waggon, belonging to Woolwich Arsenal, drawn by several horses, was brought out from behind an adjoining tower, and placed at a convenient spot; thus enabling those absent to make themselves acquainted with the exact amount of destruction which was effected.

Photography in Construction of Micrometers.

The successful application of photography in the construction of micrometers has been made by Mr. Clarence Morfit of the U. S. Assay Office, New York. It is merely the reduction of a large scale of exact dimensions and divisions to a definite size suitable for microscopic instruments. A scale of ten inches divided into inches and tenths of an inch has been reduced in this manner to one-twentieth of an inch, thus making its smallest divisions equal to one two-thousandth part of an inch square. The method is simple, accurate, and economical. Moreover, the micrometer has the advantage of giving the exact measurement of the object in fractions of an inch, and at the same time determines the power of the microscope itself.

Report of the Committee, consisting of Messrs. Maskelyne, Hadow, Hardwich, *and* Llewelyn, *on the Present State of our Knowledge regarding the Photographic Image**.

The chemical problem presented by the photographic image is one of great complexity. It is uninviting to the chemist, in so far as it presents very little opportunity of his obtaining quantitative results; for howsoever subtle and rapid be the chemical transformation effected by the light, it consists, in most cases, of a superficial change only, and defies even the delicate methods of the balance. In undertaking to collect what is known and to test the correctness of what has been published regarding this intricate problem, the Committee have proposed to themselves to deal first with the simplest transformations on which photographic processes are founded, and to pass on from these to the more complex.

Moreover they confine themselves to the photographic results obtained with the salts of silver, as these are the most employed, and because it is necessary to assign some limits to their inquiry.

If the salts of silver are the most remarkable for their susceptibility to photochemical change, one is naturally led to search first for the causes of this among those simpler compounds of the metal in which the transformation is not complicated by the secondary decompositions which might be expected to accompany it in the case of organic compounds. Yet among the inorganic compounds this susceptibility to photochemical decomposition is rare; and though not absolutely confined to one salt, the chloride of silver, that body exhibits the simplest and one of the best illustrations of it.

The chloride of silver, when perfectly pure, passes, on exposure to light, from its pure white through various stages of change in hue, in which blue is mixed with grey, until it finally reaches a deep slate-violet colour. Chlorine is evolved from the chloride; but the question which here meets us *in limine* is one which probably underlies the whole of the problem we have to consider, and consists in the chemical condition in which the silver remains after the light has completed the decomposition so far as it can go. Is the result a subchloride of silver? or are the chlorine and the silver completely dissevered, the gaseous elements going away, and the metal remaining mixed with, or rather encrusting, particles of unaltered chloride?

Certainly the weight of authority is in favour of the latter view. Such, at least, is to be gathered from papers by Dr. Draper of New York*, by Mr. Guthrie†, and more recently from a series of papers by MM. Davanne and Girard, in France.

In the first two memoirs referred to, an allotropic state of the metallic silver is viewed as the only explanation of the reactions of the dark substance formed by the light. No chemist, however, has yet produced this substance in such a state of purity as to be able to subject it to an analysis; and the only arguments, therefore, which can be relied on in explanation of the change are such as make the fewest assumptions and put the least strain on the present experience of the chemist.

* From the Report of the British Association for the Advancement of Science, 1859.

* Phil. Mag. xiv. 322.

† Chem. Soc. Quart. Journ. x. 74.

There have been many methods proposed for the production of a subchloride of silver by processes directly chemical. One of these consists in the suspension of silver leaf in a dilute solution of sesquichloride of iron, or of chloride of copper. But this experiment has been repeated by us, and we are compelled to look upon the purple-tinted product as chloride of silver accompanied by but a trace of a substance possessing a profoundly-colouring power, which, as will presently be explained, we believe to be a subchloride.

In order to produce this substance with at all events a greater approach to isolation, we endeavoured to avail ourselves of the possibility of a reaction between chlorhydric acid and the suboxide of silver, and with this view instituted many experiments for the production of this last body in a state of chemical purity. Memoirs devoted to the chemistry of the suboxide of silver are not rare. Professor Faraday* showed that the deposit formed by the exposure to the air of an ammoniacal solution of oxide of silver, consists of a compound with a composition of 108 silver and 5·4 oxygen. This composition is incompatible with a formula Ag_2O (supposing oxide of silver to be AgO); but the physical characters of the body are interesting. It is grey, and by reflected light is seen to possess a strong lustre. By transmitted light a thin layer of it appears bright yellow.

Rose† has called attention to various other reactions in which suboxide of silver appears to be formed. Thus, if ammoniacal solution of nitrate of silver be added to photosulphate of iron, a deep and intensely colorific black precipitate is formed, consisting of a compound expressed by the formula $Ag_2O, 2FeO, Fe_2O_3$. Similar or analogous products of different composition are formed by the use of salts of the manganous oxide, and by solutions of cobalt; but in all these cases the suboxide of silver is associated in combination with other bodies, and does not present itself in a state from which it would be easily convertible into a subchloride. Rose, indeed, has made, in connexion with these researches, one remark which has a significance of some value for the photographic chemist. He shows that, in the case of adding the acetate of silver to a protoacetate of iron, the precipitate presents the black tint and deeply colorific power which seem to characterize the compounds of the suboxide of silver. When the salts used, however, contain "strong" mineral acids, as when nitrate of silver and sulphate of iron are the mutual precipitants, the deposit is grey and metallic—the reduction of the silver is, in short, complete. The significance of this fact we shall hereafter recall.

* Quart. Journ. Sc. iv. 268.

† Journ. Pract. Chem. lxxi. 215, 407 *et seq.*; see also Wöhler, Pogg. Ann. xli. 344.

The processes which seemed to hold out the greatest prospect of success for the production in the first place of a suboxide, and subsequently of a subchloride, by the methods of the laboratory, and independently of the action of the light, were those afforded by the reduction* of the citrate of silver, and by the conversion of arsenite of silver† by the action of a caustic alkali into alkaline arseniate, accompanied by a reduction of the oxide of silver to a mixture of metallic silver and suboxide, thus:

$$3\,AgO\,AsO_3 + 3NaO\,HO$$
$$= 3NaO\,AsO_5 + Ag_2O + Ag\ddagger.$$

Of the results yielded by the first of these, none were found that gave any promise at all satisfactory. Hydrogen was passed through citrate of silver suspended in hot water. The products, at first brown, and then black, and finally grey, were examined at various stages of their progress in coloration, citric acid being used as a solvent to remove the citrate and the oxide§, the residuary product being examined by treatment with dilute chlorhydric acid to convert it into chloride. The citric acid solution was found to contain nothing capable of reducing permanganate of potash, and must therefore have been free from suboxide. The result of

* Wöhler, Ann. Pharm. xxx. 3.

† Wöhler, Ann. Chem. Pharm. cl. 363.

‡ The formula for arsenite of silver usually accepted is $2\,AgO\,AsO_3$, but we find Wöhler's formula as above given to be the correct one.

§ The brown product became converted into the black one by the treatment with citric acid. Both underwent similar changes under the successive action of chlorhydric and nitric acids, and both previous to this treatment reduced the permanganate of potash powerfully. But it was found that the citric acid alone was capable of reducing the deposit to the grey condition of metallic silver, withdrawing from it at the same time (all the) oxide of silver,—a result which seemed to render almost hopeless the effort to form the suboxide by its means.

Indeed the mere boiling of the citrate blackened it, producing a dark-coloured mixture of silver with some compound of the suboxide, the citrate itself undergoing a transformation which must have lowered its saturating power, as the solution remained neutral. The citrate, however, when thus boiled with water through which a stream of hydrogen was passing, became more darkly coloured, but imparted an acid reaction to the water.

The black body that results from the reactions described, contains organic matter, as it intumesces when heated. It cannot therefore be merely a mixture of metallic silver with the suboxide.

The dry citrate heated in a stream of hydrogen is very slowly affected at 212°, but passes at length into a substance which produces on the one hand a dark-brown solution, and on the other a brown residue which yields a very pale-red body on being transformed by chlorhydric and nitric acids.

itself may not assist in effecting decompositions under the influence of light. To determine this point, Swedish filtering paper, as the type of the most uniform and pure fibre of paper that could be procured, was treated with nitrate of silver alone: on being exposed for some hours, it exhibited a pale-reddish stain, which after several days' insolation reached no deeper tone than a brown. The substitution of ammonio-nitrate of silver for the nitrate gave a rapidity to the change, and ultimately a depth of opacity to the result, by affording an antagonism, as we suppose, to the influence of the nitric acid. The reactions of the darkened ammonio-nitrate paper are as follows:—Ammonia does not otherwise affect it, than that treatment therewith (probably by action on the tissue of the paper) makes it slightly more readily acted on by other reagents. Nitric acid, though exceedingly dilute, rapidly dissolves it. Indeed an acid so far diluted that it took many hours to destroy the substance left by treating with ammonia Swedish paper that had been prepared with chloride of silver and subsequently darkened in the sun, was able to destroy this bronzed image formed by the ammonio-nitrate in a few minutes. Cyanide of potassium in presence of air rapidly destroys it, but not so rapidly as it does the image on chloride of silver just alluded to.

[To be continued.]

CORRESPONDENCE.

All communications for the 'Journal,' and on business relating to the Photographic Society, may be addressed to the Secretary and Editor at Messrs. Taylor and Francis's, Red Lion Court, Fleet Street, E.C.

The Rooms lately occupied by the Society at No. 1 New Coventry Street, W., are now entirely closed.

W. R. (*Selby*).—1. We have often found that if the collodion is allowed to become more dry than usual before immersion in the nitrate bath for excitement, the picture, from being on the surface, is liable to be damaged by the varnish; and this may take place with whatever sort you use—you must not blame the manufacturer. 2. In taking stereoscopic pictures with a single lens, it is quite indifferent which side you take first, provided you shift the camera on the sliding stand so as to create the angle. In using two lenses, the pictures must be reversed; and in all instances, when mounted, care should be taken not to place the pictures too far apart; about 2 inches and ⅞ths from any given object to the relative one, will nearly in all cases give the greatest stereoscopic results to the beholder.

R. D. (*Fortes Fortuna Juvat*).—We have your private note, but not the communication to which it refers; if you would kindly address us again, it will be esteemed a favour.

Tyro.—Mr. Highley's Table of Antidotes has already appeared in another Journal. Want of space in our present Number compels us to omit its insertion.

An Exhibitor.—We again repeat, that we believe every one who was a *bonâ fide* exhibitor at our late Exhibition, and whose pictures were sent to the Crystal Palace, has received a free admission. If any neglect has occurred, it has been entirely accidental. The Crystal Palace Company have acted with the greatest liberality.

PHOTO-ZINCOGRAPHY.—*R. D., An Engineer, &c.*—Col. Sir Henry James has published the result of his experience up to the present time in this art, and at "so trifling a cost, that all who take an interest in the subject may easily procure a copy." If you send seven penny stamps to Forbes and Bennett, Booksellers, Southampton, you will receive the pamphlet by return of post. It contains an excellent specimen of type and print executed by photo-zincography. Sir H. James has been induced to print this little work in his anxiety to give every facility to photographers who are desirous of making themselves zinco-photographers. In the next Number of this Journal, by the Colonel's kind permission, we shall reprint his instructions in detail.

W. H. B.—The Index will be issued with the next Number, which will complete Volume VI. of the Journal.

Injustice (*City*).—The Report from the Select Committee on the South Kensington Museum, with the proceedings of the Committee, is published, and may be procured at the Parliamentary Office of Printed Papers.

W. G. (*Camberwell*).—1. Mr. Burnett has paid more attention to the subject of the use of the salts of platinum in photography than any other writer that we are acquainted with. In the Photographic Exhibition of 1859, he exhibited a series of photographs so produced. Some of our friends have succeeded tolerably, following his instructions; but we have never seen a print toned with platinum to equal in beauty one treated with gold. 2. The work you speak of may be procured of Messrs. Newman, Soho Square.

Alpha (*Hoxton*).—We should strongly advise you to try the mode of toning as recommended by Mr. Maxwell Lyte in a former Number of this Journal.

J. H. H.—Some of the samples of so-called albuminised paper are prepared with a mixture of gelatine instead of pure albumen. When that is the case, the paper will not keep after it has been excited, and the nitrate bath is soon discoloured upon which it is floated.

An Amateur Subscriber.—Plates prepared for the Fothergill process, and exposed for a short time in contact with a negative, being afterwards developed by gallic acid, give very beautiful transparent pictures. The film is quite sufficiently hard to receive any transparent colours, and they may afterwards be protected with any hard varnish at hand. We have found the French varnish of Soehnée very convenient for this purpose.

Communications received.—Mr. Clark; Mr. Rockstro; H. de Lisle; A. J. Adderley; Captain Lyon Playfair (Aden); Charles Vignoles, F.R.S.; W. Roberts; J. D. Llewellyn, Esq.; and S. Thompson.

Letters of inquiry to the Editor can be answered only through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. TAYLOR and FRANCIS, Red Lion Court, Fleet Street.

THE PHOTOGRAPHIC JOURNAL,

BEING THE

JOURNAL OF THE PHOTOGRAPHIC SOCIETY.

No. 101. SEPTEMBER 15, 1860.

In the last Number appeared some observations on the subject of photographs being sold by the Government, as it seems to us, at prices so exceedingly low and unremunerative as to prevent due enterprise and competition on the part of photographers in general. For that article the Editor is entirely responsible, and he wishes to state that it is in no way to be considered as the opinion advanced by the Council of the Photographic Society. At the same time, he is fully satisfied of the fairness of the view which he entertains, confirmed as it has been by an extensive correspondence with many practical professional photographers, none of whom have differed with him. Our readers' attention is directed to a letter from a member of the Council, contained in the pages of the present Number.

We insert a valuable contribution from Mr. Prichard of Leamington, who has done so much good service in former years for the advancement of the photographic art. The specimens of negatives which he has sent with his letter are exceedingly good, and amply bear out the favourable terms in which he speaks of his process. The first specimens sent by Mr. Prichard were received several weeks since; and a frequent correspondence has taken place between him and the Editor. Since the present communication has been in type, Mr. P. writes, "I have just read, in Mr. Sutton's 'Photographic Notes,' a paper by M. Blanquart Everard. In essential principles the plan is the same as I have described, but it differs in the use of a saturated solution of iodide of potash, instead of a very dilute one, and, again, in the use of a 60-grain solution of nitrate of silver, instead of a 30-grain one, for sensitizing: there is also no washing; and hence the rapid decomposition of the sensitized surface. He gives a direction which experience has taught me to be a valuable one—the only surface-drying of the iodized paper. If you will try both plans, and use each paper some days after preparing it, you will, I think, find that there is a great difference and I believe it will be in favour of the more simple plan which I have advised." The paper sensitized as Mr. Prichard recommends, certainly keeps unimpaired for several days—a great advantage over paper prepared according to the usual Calotype process. Where, however, a paper can be used and developed within 24 hours after it has been excited, we believe the results will be as satisfactory as can be desired, and far more convenient and certain than trusting to the use of many of the dry-collodion processes on glass. Whilst writing on the subject of photography on paper, we may mention a fact which we have no doubt will startle most of our readers—that after the use of chlorine in the bleaching of rags used for the better sorts of paper, hyposulphite of soda is often largely used, and is sold in the trade as "Anti-Chlo."

We would also desire to draw the attention of photographers to the good qualities of a batch of paper recently made by Messrs. Towgood Brothers expressly for photographic printing; and we may safely state, from actual experience, that, either for plain salted or for albuminizing, it is superior to any which has been before brought under our observation. It may be procured from nearly all respectable dealers in photographic papers; but unless our friends ascertain that they actually purchase Towgoods' paper *made for photographic purposes*, disappointment will in all probability ensue. Their ordinary paper for commercial purposes has their name in water-mark, whilst the photographic paper has not. Should they suc-

ceed as well in the manufacture of a paper for negatives—in fact, such as the old Turner paper was of some years since—photographers will have had a great boon conferred on them; and the great difficulty which has existed, of their being always able to obtain a paper uniformly good and certain, will have passed away.

Death has lately removed from amongst us a good man, and an excellent photographer, Mr. Peter Wickens Fry. He was the friend of the late Mr. Archer, and used great exertions to bring Mr. A.'s discovery of the Collodion process before the public. Mr. Fry introduced Mr. Archer to the late Mr. Horne; and in Mr. Horne's exposition-case at the Great Exhibition of 1851, we believe the first collodion picture which was *publicly* exhibited was shown by Mr. Fry. Mr. Fry had from the first introduction of photography taken a great interest in the art, and as an amateur he practised it with much success. He was active in his aid to Mr. Fenton in the formation of the Photographic Society, and remained a member of the Council until his continued ill health compelled him, with much regret, to relinquish his seat during the last session. His loss will long be regretted by those who knew him and had the advantage and pleasure of his friendship.

The Council of the Photographic Society, in proposing to print in the Journal abstracts of papers read at the Ordinary Meetings, or in giving the papers at length, do not thereby adopt the views or opinions of the authors.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of his good faith.

The same proviso extends to communications to the Editor.

Report of the Committee, consisting of Messrs. Maskelyne, Hadow, Hardwich, *and* Llewelyn, *on the Present State of our Knowledge regarding the Photographic Image*.*

[Concluded from page 312.]

It would be difficult, from the above reactions, to come to any positive opinion on the nature of the photochemically changed substance left by the ammonio-nitrate of silver on pure tissue of paper. But that this tissue is not without a part to play in the changes which the oxide of silver undergoes, perhaps even a more important one than that of an absorber of oxygen, seems indicated by one curious experiment. Swedish filtering paper treated with nitrate of silver, and while still moist touched with a solution of protosulphate of iron, gives a grey stain easily recognized as metallic silver. When, however, it is suffered to dry (of course in the dark), the stain thus formed, instead of a grey, exhibits a dense black tone, which immediately afterwards passes on into a brown. The former of these is probably suboxide.

But if the tissue of the paper is not to be altogether excluded from the list of possible cooperative agents present in these processes, there are other substances of which the influence can be demonstrated in a manner quite satisfactory to the photographist. Gelatine as size was long employed without his being conscious of its importance; and he now uses albumen as a photographic glaze, and sometimes other substances, such as grape-sugar, Iceland moss, caseine, &c., on account of the fine tones and permanence in the fixing bath which they impart to his pictures. Gelatine and albumen both combine with nitrate of silver; and the character of the combination is one which chemistry has yet to explain with completeness. These compounds differ from each other in many important respects: we shall select that with gelatine for illustration. The characters of the compound of gelatine and nitrate of silver are exhibited by the following statements.

If a sheet of transparent gelatine be floated upon a solution of nitrate of silver, the solution loses a considerable amount of the dissolved salt. When the proportion of the gelatine to the bulk and strength of the solution is sufficient, free nitrate of silver is scarcely to be detected in the bath, and what silver is found there is probably in the form of a gelatine-compound, which is not entirely insoluble. The gelatine mass, though but slightly soluble in cold, is so to a considerable amount in hot water, and retains at once the neutrality and the taste of the nitrate. The solution gives the following reactions:—

Caustic potash throws down a bulky olive-brown precipitate, which clots into a tough extensile mass. This dissolves by boiling with excess of the precipitant, yielding a very dark, and when diluted, a clear yellowish-brown solution.

Strong ammonia produces no precipitate, but on boiling forms a pale orange-yellow solution, on which the light pr duces little or no change.

Chloride of ammonium, introduced cautiously, produces no precipitate, but in excess renders the solution turbid. The clear liquid is not rendered turbid by boiling; but a few drops of nitric acid, if the temperature be

* From the Report of the British Association for the Advancement of Science, 1859.

raised to the boiling-point, suffice to render it milky from separation of chloride of silver, which may be redissolved by ammonia, or darkened by the light.

Iodide of potassium, unless carefully introduced, throws down in it a turbidity of a yellow tint. But if this be removed by filtration, it will be found that the addition of the most dilute nitric acid and boiling throws down a fresh amount of iodide of silver.

Cold nitric acid produces no change in the gelatino-nitrate(?) of silver, even when formed from the ordinary commercial gelatine; but boiling throws down sometimes a small quantity of chloride, originating in the impurity of that body.

Chlorhydric acid in minute quantity produces also no precipitate until boiled, when the chloride of silver separates from the compound.

The gelatinous mass, formed by the action of the nitrate of silver solution upon the gelatine, becomes, on exposure to the sunlight, of a red colour. The change is a rapid one, and is accompanied by a shrinking of the mass to its original character of a thin sheet as it dries. The colour attained by prolonged solar influence is by transmitted light a deep ruby, and a "bronzed" green by reflected light. Sheets of the gelatino-nitrate of silver thus solarized no longer swell up or dissolve in boiling water, but only after long boiling become disintegrated in filmy fragments. Potash gives, on boiling, a clear solution, which even when dilute is brownish red, and appears opake when concentrated. Ammonia added to this liquid diminishes its opacity and gives it an orange hue.

In inquiring what the character of the change effected in these bodies is, we would direct attention to a process analogous to that by which the citrate of silver was examined. If hydrogen be freely passed over the albuminate of silver in a water bath, this becomes converted into a red body resembling in all essential particulars the red substance into which the light converts the same albuminate. In each case the reaction with the different tests is the same. That, in fact, a suboxide is in each case formed, and that this suboxide is in combination with the albuminous or gelatinous substance, seems the natural conclusion from what has preceded, no less than from the reactions of the bodies themselves.

The silver cannot be there in the metallic form; else, why should potash dissolve it, and why should ammonia convert it into a paler body? Moreover, metallic mercury does not amalgamate with it. One reaction, indeed, might be urged as militating against this view. The hyposulphite of soda has but little action on the red compound, whereas it dissevers the constituent elements of suboxide of silver as dissolved oxide of silver and residuary metal. But we have shown that silver is not entirely precipitated from its gelatinous nor from its albuminous compound by such tests as chlorides or iodides; and one will hardly therefore see with wonder that the albuminate or gelatinate of the suboxide resists the action of the alkaline hyposulphite. Nor would it be out of place here to hint, as our colleague Mr. Hardwich has done, at the high probability of the suboxide of silver associating itself with organic substances such as cellulose, albumen, gelatine, &c., in a manner analogous to that in which other metallic salts, in which the metallic element is not entirely saturated by metalloid elements, act the part of conjugate bodies, annexing themselves to the organic substances alluded to, and to colouring matters of various kinds. The action of these mordants belongs still to an obscure chapter of chemistry, but it is highly probable that the compounds under consideration are closely allied to them.

Finally, we have to bear in mind that the fixing agent modifies the image formed by the light in the materials we have been considering.

The alkaline hyposulphite, like ammonia, acts on the subchloride or the suboxide of silver, splitting the one into metallic silver and chloride which becomes dissolved, and the other into oxide and metal.

Obviously the conversion of an image formed of either of the intensely colorific subcompounds of silver into a pale metallic deposit containing only half the amount of metal, and possessing none of the remarkable colorific energy of the suboxide or subchloride, is a conversion that can only be expected to exhibit a great loss of tone. Practically the singular immunity from this dissevering action which the organic matter, combined with or conjugated to the subcompound of silver, extends to that subcompound, comes in to help the photographist from losing the beautiful result which the light itself produces. And what little be still must lose he can almost restore again by the remarkable toning methods which he has recourse to.

The rationale of these toning methods is to be sought in the chemistry of each different process. The deposit of gold from a solution of that metal is in its broad features a simple reaction—a deposit of a more electro-positive metal in substitution of one less so,—but the precise details of each method of using a gold toning-bath doubtless involve more refined

chemical explanations. Without attempting to go into these, we would invite attention, however, to the sulphuretting baths by which this toning is sometimes conferred on the pictures. Sulphide of ammonium converts the fixed image on paper into, first, an intensely black compound, and subsequently, by its continued action, into a dull yellowish, scarcely visible stain. The latter, there can be little doubt, is sulphide of silver. It seems highly probable that the intermediate step in the process is the production of a subsulphide, and that it is at that stage that the progress of sulphurizing is arrested in a successfully-toned picture. This explanation would be quite in harmony with the conditions under which the toning is performed.

The results, then, at which we conceive that photographic chemistry may be said to have now arrived, in respect to the direct processes involving the use of silver-salts, may be thus stated.

The materials employed perform various functions:—

1st. One of these is that of supporting the picture, as a mechanical material or basis for holding the chemical bodies. Of the substances so employed the tissue of paper is one. Pyroxyline (the product of a substitution effected in the elements of the cellulose) is spread on glass to afford another. The latter appears to be inert. The former, on the other hand, seems to aid in the reduction, and possibly in some cases to remain in union with the reduced result.

2ndly. The silver-salts employed, whereof the chloride—for which may be substituted other salts, as the tribasic phosphate, the tartrate, the citrate, and many others, though each with a specific effect—appears to act by imparting *sensitiveness*. The nitrate, on the other hand, is present in excess to keep up a constant succession of sensitive material, and so to give *vigour* and *intensity* to the image.

3rdly. Gelatine as a size, or albumen as a glaze, and various other substitutes for these (though but little linked together by any chemical analogy amongst themselves), cooperate by conferring *rich tints* and deep tones, while they at once impart to the image formed on them an immunity from the destroying action of the fixing process, and form a mechanical surface more or less impenetrable, which prevents the other sensitive compounds from sinking into the paper.

Each of these substances can, provided nitrate of silver be present, be employed to produce an image. Thus, the chloride rapidly produces a faint picture; the "gelatino-nitrate" slowly yields an intense one; together they produce the required result. Whether that result is a cumulative one, the sum of the separate results, or a conjoint one produced by a combination of the chloride with the gelatine compound, it were difficult to say.

The image is, however, a mixed one, for treatment of it with dilute nitric acid leaves the slaty violet subchloride of silver. It seems therefore to be a mixture of subchloride with a gelatinous, and perhaps also a cellulose-compound of suboxide of silver.

The next great division of our subject which we have to enter upon is that of photographs produced by development.

Fortunately, in dealing with the images thus formed, we are able to dissever the results from the magic influence that calls them into being. We need only show that certain conditions are necessary for the impress of the invisible image; we are not called on to explain the character of the impress itself. Without attempting to explain what goes on in the camera obscura, we may determine the conditions for a favourable action in it, and interpret the results of that action after development: though even here, from the great delicacy of the processes employed, the task is a most difficult one.

With regard then, first, to the preparatory portion of these processes involving the production of the sensitive surface. This consists, in the processes on glass, in a supporting film, and generally in iodide of silver formed under conditions in which nitrate of silver was in excess. There are also generally present other ingredients, such as certain forms of organic matter, and in some cases bromide or even chloride of silver.

That it is not a matter of indifference whether the supporting basis, or film, consist of pyroxyline, or albumen, or gelatine, or of these severally combined with other bodies or with each other, one might readily suppose from what has been already said under the head of direct processes; and it will be no difficult matter to show more than a probability that this is not due to a "molecular," but to a "chemical" distinction in the action of these bodies.

The usual sensitive surface contains, if it does not consist in, iodide of silver with an excess of nitrate. But there are processes in which the plate is studiously washed with water to remove the nitrate, whereby, though it is impaired in sensitiveness, it retains enough of that quality for the production of excellent results. Though this retention of a susceptibility to the invisible impression has been attributed to mechanical causes, such as the state of division of the iodide, the porosity of the

film, &c., the following facts seem to favour a chemical explanation. Pure pyroxyline united with pure iodide and nitrate of silver, from which the nitrate of silver has subsequently been removed, and the film dried, is not susceptible of quick development after exposure in the camera; a mere trace of albumen introduced before the removal of the soluble silver-salt, however, prevents its entirely losing this susceptibility. Gelatine, certain forms of sugar, resins, and various other bodies widely differing from one another in point of chemical character, possess a similar property, though the precise regulation of the processes employing them can hardly be said to be as yet mastered by the photographist. The products of decomposition contained in "old collodions," and some of the fresh preparations of pyroxyline, in which secondary products are not studiously prevented from being formed, would seem to share this power with the classes of bodies referred to.

But a question of the utmost interest to the scientific inquirer is involved in the chemistry of the iodide of silver; first, in respect to its power of forming combinations with the nitrate of silver, and secondly, as regards the probability of these combinations forming photographic compounds with the albuminous and other bodies alluded to.

That the excess of nitrate of silver which is necessary in the *first* preparation of all the sensitive films does not act the same part as that excess does in the case of the chloride in direct processes, will be evident at once, inasmuch as the iodide of silver does not undergo reduction in the manner that the chloride does. In searching, therefore, for an explanation of the necessity of free nitrate, the mind naturally dwells on the compounds shown by Schnauss* and A. Kremer† to be formed by the action of strong solution of nitrate of silver on the iodide. Although the production of these bodies in any quantity and in a state of chemical purity needs conditions not present on the photographic film, yet there seems little doubt that, as iodide of silver is dissolved by the nitrate, traces of these remarkable compounds can readily exist in the films containing these two ingredients. If so, the highly photographic character of the compound containing 2·8 per cent. of iodide of silver described by Kremer, and the fact of these bodies being decomposed with the separation of iodide of silver by the action of water, are facts of high interest to the photographic chemist, and seem to throw considerable light on the hitherto obscure processes in which iodide of silver is

* Archiv der Pharm. xcii. 260.

† Journ. für Prakt. Chem. lxxi. 54.

employed. These two facts, indeed, may be held to explain, very nearly, the character of the ordinary collodion process; but they do not explain the "preservative" processes, in which the sensitiveness of the film is, within certain limits, retained by the introduction of albumen, gelatine, resin, sugars, or other organic substances, to the number of which experience is continually adding.

For the explanation of the action of these substances, we must recur to the facts already cited in the case of gelatine when used as a size in the direct processes. Thus, too, a plate coated in the ordinary manner with albumen containing iodide of potassium dissolved, will be found, on being raised from out of the silver-bath, not to be opake, and coated with a dense deposit of iodide of silver, but to appear highly translucent and opalescent in its character—and that, even though the iodide be introduced with a liberal hand. In fact, the albumen is present not merely as a mechanical vehicle for the sensitive materials, but can be proved to have combined with those materials, and to play no insignificant part in their photochemical transformation. That this is so, may be at once shown by adding some albumen to a quantity of the ordinary "silver-bath"—say the white of one egg, diluted with 1½ ounce of water, added to 40 ounces of bath. The iodide of silver with which the bath was previously saturated will be found in it no more; it is now to be looked for in the gelatinous precipitate which the albumen has formed. The precipitate is, in fact, a chemical compound of albumen with nitrate of silver holding in combination the iodide. This is, as might be supposed, from what has been said of the albuminate alone, a highly photographic compound. We have stated that a similar compound is formed by gelatino-nitrate of silver and iodide of silver. Citrate of silver, glycyrrhizine, and many other bodies share with these substances, and the first two possess even in a far higher degree than they, the property of carrying down in a combination—or, so to say, in solid solution—the iodide of silver, and forming with it highly photographic products.

A hiatus must needs occur in this stage of our inquiry. The sensitive film is exposed in the camera, and in a few instants the invisible image is impressed. We remove it, and our task begins again at a tangible starting-point. The development of the image is the visible evidence that the light has been at work, and a close examination of the nature of this image is the only further key we possess to elucidate the character of the light's action.

By a comparison of the developed images formed on plates that have been exposed for

the correct time to produce a good picture with such as are produced by the direct action of the light, we arrive at two conclusions. First, a general similarity in the appearance of the various sorts of images by each method is observable; but, secondly, the deposit in the case of the developed image is far more abundant than that in the direct image. The comparison as regards the quantity of deposit in any two images is one far too delicate to be effected by the balance; but a method of instituting such a comparison with great accuracy is founded upon the ready conversion of any such images into sulphide of silver, a body transparent and yellow in thin layers, but passing through tones of sepia to almost a black opacity as the thickness is increased. The colour becomes thus a good means of comparing any two deposits; and the complete conversion of these into the sulphide is ensured by the use successively of chlorine-water and of sulphuretted hydrogen. A similar comparative result may be obtained by substituting the chloride of mercury for the chlorine-water.

Now the deposited images in the case of the processes by development present some points of great analogy to those formed in the direct processes; in others these images widely diverge from them. Thus, we seldom find in them those purple and violet tones which seem to characterize the subchloride of silver before fixing. On the other hand, we observe two classes of developed images:—the one is of a dull metallic appearance, of a slaty-grey character by transmitted light, and in but a feeble degree opake; the other varies in colour, exhibiting brown or red hues, and sometimes even presenting perfect opacity to transmitted light, closely similar to the picture formed by direct processes. But on testing these two varieties of image by the method of conversion into sulphide of silver before described, it is found that the dull translucent metallic image teems with silver, and becomes very opake in the form of sulphide, while the more richly coloured and dense-seeming image loses opacity under the sulphurizing action, and exhibits at last a subdued tone of colour that brings it more on a par with the sulphuretted metallic image. Clearly then, here, density, and the qualities which give photographic value to an image, do not depend on the amount of metal that goes to form it, so much as on the chemical, and even perhaps mechanical state in which that silver is present in it.

The several causes which determine the deposit of the images in these several states appear to be these:—

1. *The materials forming the sensitive film.*—Pyroxyline, in chemical purity, has little tendency to form the darker image. Albumen and the heterogeneous substances (including decomposed collodions), which we have had to yoke in the same class with it, have this tendency.

In general (speaking of the ordinary moist process) the tendency to produce the darker image is found to be in something like an inverse ratio, *cæteris paribus*, with the sensitiveness.

The use of the bromide of silver with the iodide imparts to a collodion film a tendency to deposit the grey metallic image, at the same time that a more powerful reducing agent is needed to develope it. It is a remarkable fact, bearing upon this singular property of bromide, that no compounds analogous to that formed by A. Kremer with the iodide have yet been formed with it. In the case of albumen, this influence of bromide is not felt; for with albumen, bromide of silver is held to increase the opacity of the image.

2. *The nature of the developing agent.*—The substances used to develope the latent image, besides the free nitrate of silver invariably necessary, embrace also without exception one ingredient, the character and the purpose of which is to reduce the salts of silver. In some cases organic bodies are employed for this purpose; in others the reducing agent is inorganic. Now, whether the grey or metallic form of image is completely reduced silver, and the more opake forms are an argentous compound (mixed or not with metallic silver), or whether all the forms of image are silver in different mechanical states of deposition, is a very important inquiry, and one on which the facts of the development and the nature of the developing agent may throw some light.

But no one who is intimate with the complex and perplexing details of this step in the photographic process will expect the chemist to come in and remove the difficulty by the use of a few formulæ. All we can hope to do is to point to a few sure results of experience, and indicate any explanation which may be suggested by facts from the laboratory analogous to these.

It is known, then, that to produce a "positive" picture in the camera, the developing agent should be sulphate of iron, acidified in some cases even by nitric acid. The result is the crystalline white deposit of metallic silver. Protonitrate of iron is used with a similar result. So likewise in the laboratory it is known that a neutral mixture of the ferrous sulphate and nitrate of silver forms the grey deposit, but that the addition of a little acid produces the white and brilliant form of the metal.

If now we would take a result opposite to

this from the experience of the photographist, we may select an ordinary collodion plate prepared by the usual negative process, and we shall find that protacetate of iron developes the image of a black colour. Now Rose, in the remarkable experiments on the production of argentous compounds with the higher oxides of iron, &c., to which we have called attention, shows that, whereas the argentic salts containing strong mineral acids are precipitated as grey metal by ferrous salts containing similar acids, the deposit formed by uniting the ferrous oxide and the argentic oxide, or the compounds of these with organic weak acids, contain the suboxide of silver, and are black.

When to this is added the circumstance that the white and grey photographic images are with facility amalgamated with mercury, but that the coloured and black images are not, it may be treated as a matter of high probability that the black and coloured images are formed by compounds of the suboxide of silver.

A directive energy is exercised upon the nature of the deposit by the various kinds of organic matter employed in the development. These all seem to restrict the limits of variation to the dark bluish-black (given by citric acid when present), on the one hand, and various reds and browns upon the other; while, again, the presence of the albuminous and other substances, so often before referred to, is, as was above remarked, a sure means of forming these darker and coloured images. Indeed, albumen will determine such images notwithstanding that even free nitric acid be present with it. If it be a suboxide that causes the dark precipitate, that suboxide must go down in combination, and so resist the action of the fixing solvents.

But, 3. *The character of the light* has also a remarkable influence in inducing a grey or a dark character on the developed image.

If the picture has been produced by an intense light, as by a lens of large aperture, or as in the case of an exterior as contrasted with an interior view of a building, or as on a dull, misty day in contrast with a bright and sunny one, it will be found that, *cœteris paribus*, the tendency of the weaker action of the light is to allow the reduction of the silver in the metallic form. On the other hand, the more intense light has given to the molecules of the sensitive film a controlling energy which they exercise on the deposit, and which appears analogous to that of the light in the direct process, in its modifying the reduction and giving it the form of a production of an argentous compound; as though the iodic compound became in a certain sense phosphorescent to the chemical rays of the light, and operated on the mixed silver-salt and reducing agent as they float over it in the manner that the direct light might be supposed to do.

Of course, the materials must be nicely balanced, as regards their tendencies to produce the black or the grey images, for the peculiar action of an intense or a weak light to be made fully evident. Albumen or powerful organic agents will usually destroy this balance.

One fact remains to be observed. Whatever may have been the character of the first particles deposited on the plate, that character will be maintained thenceforward, and fresh deposits may be, so to say, piled upon the first by the singular agglutinative tendency of crystalline deposits, so long as the necessary conditions of fresh silver solution and of fresh stores of the reducing agent be supplied to keep up the action.

Our task has been, by an investigation of the chemistry of the image in its different varieties, to afford some data, at least, by which the further step may be hereafter taken of determining the precise character of the photochemical agency, to whose marvellous influences art owes so many beautiful results, and science is indebted for more than one intricate problem.

An Improved Paper Process.

To the Editor of the Photographic Journal.

SIR,—I venture to send you the results of a great number of experiments which I have made with the view of applying the late Manchester discoveries to the paper process, and also of making such improvements otherwise in that process as to give it what I have long thought it deserved—a higher place than it has yet attained, more especially in the estimation of the travelling photographer.

These experiments were founded upon the principles—

1. Of keeping as closely as possible to the collodion process, barring the collodion, *i.e.* of sensitizing the iodized paper with a 30-grain solution of nitrate of silver instead of with the feeble and rapidly decomposing gallo-nitrate.

2. Of washing the paper thus sensitized, so as to remove the superfluous free nitrate, and thus to give to it keeping properties, whilst retaining sufficient sensitiveness.

Had not my experiments been cut short by illness, I would have sent to you a few finished negatives as tests of their value; but as it is, I believe that for the present I must be contented with the negative scraps which I forwarded to you at the commencement of my

work, and I will at once proceed to lay before you what I have done.

By means of a glass rod, apply to a sheet of Turner's paper a solution of

Pot. iod. gr. vi.
Aq. destillat. 1 oz.

Pin up to dry, and sensitize (also by iod.) with a solution of

Argent. nit. gr. xxx.
Water 1 oz.
Acid. acetic. glacial. 20 drops.

et the solution remain on the paper a minute, and then float it (sensitized surface downwards) on distilled water, moving the vessel so that the water shall, for about half a minute, pass evenly and freely over the surface of the paper. Pin up; and when dry, your paper is ready for exposure. Expose with a 15-inch-focus lens of Ross and a $\frac{1}{2}$-inch stop, in sunshine, 7 or 8, or 10 minutes. Develope with a saturated solution of gallic acid, with 2 drops to the drachm of acetic acid, and 1 drop of the 30-grain bath. If any one will wash only half the paper, he will be able to test the value of the washing, and this even if he expose as soon as the paper is dry from sensitizing. Now, when it is considered that by the above most simple and effectual plan a paper may be made ready for exposure in seven minutes *ab initio*, that there is no risk of a bad lot of iodized paper, that the middle tones exceed in beauty those procurable by the old process, and that no plan can be more simple, I cannot help thinking that we have in the process described a step in advance. Increase of sensitiveness and many other improvements will come of course; but I think it is a step in the right direction. I may now describe to you a modification of the above plan, with wax and albumen, which I have only as yet tested by one experiment; as that, however, gave good results, I send you the *modus agendi*.

Wax thoroughly and evenly a piece of paper, and, by means of blotting-paper and a hot iron, remove all superfluous wax from the surface. Apply, by a glass rod, the following mixture:—

Iodide of potassium, 8 gr.;
White of one egg;
Dist. water, 3 drachms;

froth *thoroughly* and allow to subside. Apply this mixture to the surface of the waxed paper; dry, sensitize, and wash as before; so also as to exposure and developing. I believe that this plan will give all the beautiful effects of the most elaborately prepared waxed paper, with the ordinary exposure of the calotype process. The only paper I have tried was exposed, it is true, 20 minutes; but it was in a light (or rather, an absence of light) such as to make any result questionable; and yet I have a very sharp and satisfactory picture, *of foliage only*—for it was not convenient to attempt a building.

John Prichard.

P.S. I omitted to say that I had found no diminution of sensitiveness after keeping four days.

On a New Dry-collodion Process.

To the Editor of the Photographic Journal.

Cagliari, Aug. 29, 1860.

Sir,—To be able to enjoy my favourite amusement of photography in the use of dry collodion, my limited time required a process much less troublesome in preparing the plates, and much more certain in its results, than any hitherto published. I consequently commenced a series of experiments in quest of these desiderata, which has resulted in my hitting upon a process that, with me and others who have tried it, leaves nothing to desire; and I entertain hopes of its being considered a boon to the lovers of the dry process, and a convenience to all. It is as follows:—

Materials.

1. Robiquet's dry collodion.
2. Mr. Thomas's neutral nitrate-of-silver bath, as given in Mr. Lake Price's 'Manual of Photographic Manipulation,' p. 229.
3. Sugar of milk, 22 grs. / Distilled water, 1 oz. / Alcohol, $\frac{1}{10}$ oz. } Mix.
4. Nitrate of silver, 12 grs. / Distilled water, 1 oz. } Mix.
5. Nitrate of silver, 6 grs. / Distilled water, 1 oz. } Mix.
6. Mr. Hardwich's developing solution, formula No. 1, p. 222 of his 'Photographic Chemistry.'

Manipulation.

1. Coat with collodion, and sensitize as usual. (I leave the plates three minutes in the sensitizing bath.)
2. Wash in distilled water, with a rocking motion, for half a minute.
3. Withdraw the plate, and pour over it a mixture of equal quantities of Nos. 3 and 4 (Materials); allow this to remain on the plate for half a minute, then pour it off, and wash again, same as per No. 2 (Manipulation). This completes the preparatory process; and the plate must now be set aside to dry, resting upon one of its corners placed on three or four folds of blotting-paper.

Development.

On withdrawing the plate from the back, place it in water for about a minute, then retire it, and cover it with No. 6 (Materials); allow this to remain upon it for 1 minute, then pour it off (nothing is yet seen of the image), and pour over the plate a mixture of equal quantities of Nos. 5 and 6 (Materials). The image now appears instantly, and merely requires to be washed and fixed as usual.

To prevent the collodion detaching itself from the plate after fixing, I pour over it a solution of gum-arabic, 11 grains to 1 ounce distilled water.

Note.

The formula for making Robiquet's dry collodion is given in his 'Manuel Théorique et Pratique de Photographie,' p. 64 (chez Senez, Rue St. Honoré, 145). I have not succeeded in obtaining satisfactory results with any other collodion. The exposure is about one-fourth less than with paper. A friend of mine takes stereoscopic views in 15 seconds by this process. WM. S. CRAIG.

P.S. My nitrate bath is 35 grains to the ounce.

Photographs of Public Collections.

To the Secretary of the Photographic Society.

SIR,—I am desirous of pointing out to the Members of the Photographic Society and the readers of the Journal, that the Editor is alone responsible for the statements and opinions expressed in the *leader* printed in the last Number, in reference to reproductions by photography of works of art in public collections. The Council of the Photographic Society have never had the subject brought before them, and are therefore in no way committed to any opinion upon it. At the date of the last Journal the evidence given before the Select Committee of the House of Commons was not published, and the Editor's knowledge of its tenor could scarcely be reliable. The Report, however, of the Committee, who had heard all the evidence, and who were responsible to the House of Commons and the public for their conclusions, was, at that time, published and accessible to the Editor; and inasmuch as it differed from him both as to facts and opinions, it is unfortunate, and scarcely fair to photographers, that it was not given in the Journal, so as to enable every one to judge for himself. At least the fact of difference between the Committee and the Editor need not have been suppressed. The following is a complete extract of that portion of the Report which relates to this subject:—

"The collections of Reproductions by Photography and Casting have been made primarily to furnish models for the use of the eighty Art-schools in connexion with the Science and Art Department; they are obtained from public collections at home and abroad. After providing for the Art-schools, it has been thought right to give the public at large the benefit of the photographs at cost price, for the promotion of general Art-education. The Science and Art Department express a desire to avoid any competition with professional photographers by limiting their sales to photographs taken from Government collections, to which, except in rare and special cases, the trade is not admitted; but it has been objected by one commercial firm enjoying peculiar privileges of admission to collections (Ev. Scott, 856 *et seq.*), and by Mr. Fenton, a photographer of eminence (Ev. 1564), that even such a limited sale by the Department is an improper interference with private enterprise.

"There is an obvious distinction between copying and photographing pictures and works of art belonging to the public. Copying is attended by no very serious inconveniences, while photography almost invariably requires the removal of the object, deprives the public of the exhibition of it, exposes it in the light, to the risks of breakage, rain, &c., which can only be guarded against by great vigilance, requires a special apparatus of considerable bulk, and uses chemicals which are always unpleasant and often dangerous. Mr. Panizzi (Ev. 1628) shows that the only fire ever known at the British Museum was caused by the negligence of a photographer. Under such circumstances, all the witnesses agree that a general right to photograph cannot be conceded to all, like the right to copy. Mr. Fairbairn (Ev. 2054) stated that at the Manchester Art-Treasures Exhibition the photographic professors were pests, and that it was found absolutely necessary to limit the privilege to one person. In order to execute photographs in public collections, there must be a monopoly somewhere. If it be proposed to grant this privilege to a limited number of competent persons, as was at one time the practice at the British Museum, the difficulty arises which was felt by the Trustees, of deciding who is competent. Mr. Panizzi considers it 'a very difficult thing to determine who is competent' (Ev. 1631), and the Trustees were forced to say, 'We will only admit our own photographer' (Ev. 1628). For a public department to attempt to determine this question in the case of every application would lead to constant difficulties and heartburnings. Moreover, the favoured persons having the monopoly among them might league among themselves to make the public pay an unfair toll for the use of their own property. These objections would apply all the more strongly to the appointment of a single private individual or firm, as the monopoly would be all the closer. The experience obtained at the British Museum (Ev. 1628 and *passim*), as well as at the South Kensington Museum, has led to the conclusion that the only feasible course for public interests is to employ one responsible public officer; and, by harmonious co-operation between these two departments, one photographer is employed for both. A tariff of moderate prices is published at which the public may obtain negatives, and print positives for themselves. Any publisher may thus produce, and publish at his own prices, any object in the British Museum or the South Kensington Museum.*

"As respects 'positives' of public objects, the sale of them by the Department to the public is limited to objects in public collections which it is not permitted to private enterprise to photograph, and to a price only covering the cost of production. Your Committee consider that there is no other course so free from objections or so good for the public at large as the present

* "The following tariff of price for '*positive*' impres-

system of the Department. The printing of photographs stands on the same footing as the printing of Parliamentary papers, and the publishers might, as well as the photographers, complain of the low price at which they are sold. If the price were increased, there is no doubt that the sales would be greatly diminished, and the spread of knowledge of Parliamentary proceedings arrested. The Trustees of the British Museum attempted to supply the public with photographs of objects in the British Museum, at the same time allowing their photographer the privilege of publishing, but they abandoned the system after considerable losses (Ev. Panizzi, 1626, 1694).

"Your Committee have investigated fully a complaint of Mr. Scott, in respect of the photographs taken by him from Raffaelle's Cartoons. Mr. Scott complains that Mr. Caldesi was obstructed by the officer of the Department of Science and Art in taking his photographs, and that he has been undersold by the Department; but Mr. Redgrave (Ev. 1163 *et seq.*) proved that Messrs. Caldesi would have been unable to have produced any satisfactory photographs unless the Department had permitted them to have the benefit of the removal of the Cartoons by their officer, and that, as the sale of the Cartoons by the Department cannot yet be said to be in operation, the apprehension of being undersold is at least premature. At any rate, the public have no reason to regret that Mr. Scott's suggestion of vesting in his firm an absolute monopoly of the photographs of the Cartoons has not been complied with. The arrangement by which a private was joined to an official photographer was almost sure to lead to disputes, and should not be repeated."

Since the date of the last Journal the evidence has been published in a Blue-book, which any one may consult. I have read the evidence, and it appears to me to warrant the conclusion to which the Committee have come.

A MEMBER OF THE COUNCIL OF THE PHOTOGRAPHIC SOCIETY.

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sions has been sanctioned by the Committee of Council on Education:—

"FOR UNMOUNTED IMPRESSIONS.

	s.	d.
"A single impression, the dimensions of which contain less than 40 square inches, *e.g.* 5×7 inches, or 4×8 inches	0	5
40 square inches and under 60 square inches	0	7½
60 „ „ 80 „	0	10
80 „ „ 100 „	1	0½

And so on, adding 2½*d.* for every 20 square inches or under, up to 500 square inches. For prices above 500 square inches, see the detailed list.

"The Department does not charge itself with the mounting of impressions, as the public is able to do this for itself; but the agent will afford every information on the subject of mounting.

"PHOTOGRAPHS OF OBJECTS IN THE MUSEUM OF ART.

"Artists, manufacturers, and the public generally, who may desire to have photographs of any special objects in the Museum of Ornamental Art, can order negatives of such objects at the rate of 3*d.* per square inch. Any size *under* 30 square inches will be charged as 30 square inches. One proof of the negative is included in the charge for the negative. The Department does not undertake to print any further impressions."

On the Measurement of the Chemical Action of the Solar Rays. By Professor H. E. ROSCOE.

[From the 'Proceedings' of the Royal Institution of Great Britain, March 2, 1860.]

THOSE portions of the solar rays which vibrate most slowly, and are situated near the red end of the spectrum, are those which mainly regulate the alterations of temperature on the surface of our planet. They are, *par excellence*, the heating rays. They principally produce all those motions in our atmosphere which we term winds; they effect those grand phenomena of distillation and deposits which we call rains; and the amount and distribution of those heating rays at any point on the earth's surface determine the thermal climate of that point.

On a scale, perhaps, less grand, but certainly not less important as regards their effects, are the actions produced by the most rapidly vibrating portion of the sun's rays—those, namely, which are situated near the violet end of the spectrum. These rays have been called the chemical rays, because it is by these especially that the chemical action of the sunlight is effected. It is in presence of these rays alone that the plant is enabled to decompose the carbonic acid of the air, to assimilate the carbon, restoring the oxygen for the subsequent use of animals. Hence the amount and distribution of these rays at any given place regulate to a great extent the character of the fauna and flora—give, in short, the "chemical climate" of the place.

The measurement of the quantity of this solar energy falling at any time on a given spot upon the earth's surface, must be a subject of primary importance in the determination of the physical history of our globe. We fortunately possess a method, although it is only a comparative one, for measuring the amount of effect which the heating rays produce; that is, for measuring *temperature.* No such mode of measurement for those of the solar rays which especially effect chemical action has, up to the present time, been adopted,—not that meteorologists have ignored the importance of the subject, but because the difficulties which beset the establishment of a measuring instrument for chemical action were considered to be insurmountable.

The speaker remarked that his object was to bring before his audience the principles and mode of action of a method employed for the measurement of the chemical action of light*.

As an illustration of the chemical action of

* For a detailed description of apparatus, &c., see "Photo-chemical Researches," Part I. "Measurement of the Chemical Action of Light," by R. Bunsen and H. E. Roscoe, Phil. Trans. 1857, p. 355.

light, attention was directed to the fact that when a perfectly pure mixture of exactly equal volumes of chlorine and hydrogen gases is exposed to light, the gases combine, producing an equal volume of hydrochloric acid gas, whilst no such combination occurs in the dark. This combination may occur gradually, or with great rapidity. If the chemical activity of the light be great, the union takes place quickly, great heat is evolved, a sudden expansion takes place, and the vessel containing the mixture of chlorine and hydrogen is shattered by the explosion. The gradual or slow combination may be rendered evident by allowing the hydrochloric acid thus formed to be absorbed by water,—the consequent diminution of bulk of the gas accurately representing the chemical action effected.

This mixture of equal volumes of chlorine and hydrogen is used as the sensitive substance for measuring the chemical action of light. It is evolved in the perfectly pure state by the electrolytic decomposition of strong aqueous hydrochloric acid; and it is by this method only that it can be prepared. The gases thus evolved are in the exact proportion in which they exist in hydrochloric acid; so that if by any means we recombine these gases, no trace of either substance will remain behind, the whole uniting to form hydrochloric acid.

For the purpose of measuring this chemical action, effected not only by solar light, but also by light from many artificial sources, we require some instrument which is to the chemical action of light what the thermometer is to the heat-actions—an instrument which will show objectively the amount of chemically active light. We must be sure, in the first place, that our mode of measurement is a reliable one; that as in the case of the thermometer equal increments of volume correspond to equal increments of heat, so in the new instrument, the indications, however obtained, shall be proportional to, and represent the amount of chemical rays emanating from any source.

This has been accomplished in the chemical photometer, by the help of which an accurate measurement of the chemical action of light is effected.

The facts upon which this mode of measurement is based may be summed up as follows:—

1. Exactly equal volumes of chlorine and hydrogen gases, when mixed, combine together on exposure to light, forming hydrochloric acid gas.
2. This combination does not occur in the dark.
3. The quantity of hydrochloric acid thus formed is directly proportional to the intensity of the incident light, and serves, therefore, as a measure of the chemical action produced.
4. The chemical photometer is an instrument, by help of which the quantity of hydrochloric acid thus formed can be accurately measured.

The chemical photometer consists essentially of three parts: namely, first, the apparatus in which the sensitive gas is generated; secondly, the apparatus in which the gas is exposed to the light; and thirdly, the apparatus in which the volume of hydrochloric acid produced in a given time is read off.

When very numerous precautions in the management of the photometer are taken, it proves a most sensitive and reliable instrument. Having thus obtained an instrument by which the chemical action of light can be accurately measured, it only remains to graduate it. For this purpose we require a standard of light, from which the determination is to proceed. For this comparative measurement, the possession of a constant source of light is the first essential. This is obtained as follows:—

1. A flame of pure carbonic oxide gas, burning in the air and issuing from an opening of given size at a given rate, is employed as the *standard flame*.
2. *The unit amount of chemical action* is that effected by such a flame upon the sensitive mixture of chlorine and hydrogen during one minute, at the distance of one metre.
3. The quantity of chemically active light producing this action is called *one chemical unit of light*; and ten thousand of such units *one chemical degree of light*.
4. The chemical photometer is graduated by observing how many of these chemical units of light correspond to one division on the scale of the instrument.

As an illustration of the mode in which this measurement of the chemical action of light is employed, the speaker described the method by which the chemical action produced by the direct solar rays has been determined*. For this purpose, it was necessary to admit a very small, but a known, portion of direct sun-light into the dark room in which the instrument was placed, and to allow the insolation-vessel to be bathed in the pencil of rays thus admitted. By help of Silbermann's heliostat, the sun's image was reflected during the whole day upon one spot, a small opening of known size, in the

* The full memoir on this subject is to be found in Poggendorff's Annalen, Bd. cviii. p. 193. In Abstract, Proceedings of Royal Society, 1859, vol. x. p. 39, "Photo-chemical Researches," Part IV., by R. Bunsen and H. E. Roscoe.

window-shutter of a dark room. The fraction of the total sun's rays thus admitted and allowed to fall upon the chemical photometer can be calculated, and the action thus effected observed; hence the amount of action can be found which the sun would have produced if directly shining upon the instrument—a condition impossible, of course, to fulfil, as the action would become too rapid and the whole apparatus would be shattered by explosion.

The day chosen for observation of the sun's action must obviously be cloudless, if we wish to obtain an idea of the relation existing between the chemical action and the height of the sun. Beginning the observations as near sunrise as possible, we find, for instance, on September 15th, 1858, one of the days on which such a series of experiments was made, that at 7^h 9^m a.m., when the sun's zenith-distance was 76° 30′, the observed action amounted to 1·52: that is, in one minute the column of water moved through 1·52 division; or the quantity of hydrochloric acid formed, when the sun stood at the height mentioned, was represented by 1·52 division on the scale.

Gradually, as the day wore on, the observed action for each minute became larger; until at 9^h 14^m a.m., the latest observation possible on the day in question, owing to the formation of clouds, the action reached 18·5 divisions, or was thirteen times as large as at 7^h 9^m. In the last column of the accompanying table is found the action, expressed in degrees of light, which would have been observed at the foregoing times, if the whole sunlight had been allowed to fall on the instrument.

TABLE I.

Hour.	Sun's zenith-distance.	Observed action 1 minute.	Total sun's action in degrees of light.
h m			
7 9	76° 30′	1·52	5·54
7 26	73 49	4·22	15·50
7 40	71 37	6·09	22·43
8 0	68 34	7·56	27·85
8 7	67 30	8·38	38·87
8 26	64 42	12·48	45·85
8 54	60 48	17·09	62·59
9 14	58 11	18·51	67·61

This great increase in the chemical action with the rise of the sun in the heavens simply results from the fact that the solar rays, in passing through the air, are extinguished or absorbed—lost, in fact, as light, and that as the sun rises higher above the horizon, the column of air through which the rays pass is constantly being lessened; consequently more of the direct rays reach the earth.

Now, the law according to which the direct rays of the sun are thus absorbed in the air can be obtained from the experiments, of which the foregoing is only an example; hence, if the action which the sun produces when at a given height is known, it is possible to calculate the action which it would produce at any other height.

That these calculated results agree very closely with the experimental data—with the observed action—is seen by comparing the numbers in Table No. II., expressing the observed and calculated action.

TABLE II.

The amount of Chemical Action effected at a point upon the Earth's Surface on any cloudless day, by the direct Solar Rays, depends alone upon the Sun's zenith-distance, or upon the height of the column of air through which the Rays have to pass.

Sun's zenith-distance at time of observation.	Chemical illumination of sun's direct rays at the earth's surface, expressed in degrees of light.	
	Observed.	Calculated.
46° 8′	93·0	96·4
50 51	89·2	85·8
57 35	63·1	67·9
58 11	67·6	66·2
60 48	62·6	58·3
64 42	45·9	47·9
67 30	38·9	36·6
68 34	27·9	33·1
71 37	22·4	24·5
73 49	15·5	16·3
76 30	5·5	9·2

Probable error $= \pm 2·7$ degrees of light.

Knowing the law which regulates the absorption of the chemical rays, we can calculate what the action would be if there were no atmosphere to diminish the power of the rays. It is thus found that if the sun's rays were not thus weakened by passage through the atmosphere, they would produce an illumination represented by 318 *degrees of light*; or they would effect a combination in one minute, upon an unlimited atmosphere of chlorine and hydrogen on which they fell perpendicularly, of a column of hydrochloric acid 35·3 *metres in height*. The sun's rays having passed perpendicularly through our atmosphere to the sea's level, effect an action of only 14·4 *light-metres*; or nearly two-thirds of their chemical activity has been lost by extinction and dispersion in the atmosphere.

A large number of most interesting conclusions may be drawn from the facts already noticed. Thus, for instance, we may determine the chemical action which the solar rays will produce on the various planets; for we know that the intensity of the chemical illumination varies inversely as the square of the distance

of the planet from the sun. The numbers in Table III. express this chemical action in degrees of light, and in heights of columns of hydrochloric acid, called *light-metres*. Hence we see how much the sun's chemical action varies on the different planets; the superior planets receiving so small a portion as to render it impossible that the kind of animal and vegetable life which we here enjoy can there exist.

TABLE III.—*Chemical Action produced by Direct Sunlight on each Planet.*

	Mean distances.	Chemical action in	
		Light-degrees.	Light-metres.
Mercury	0·387	2125·0	235·4
Venus	0·723	608·9	67·5
Earth............	1·000	318·3	35·3
Mars	1·524	137·1	15·2
Jupiter	5·203	11·8	1·2
Saturn	9·539	3·5	0·4
Uranus	19·183	1·0	0·1
Neptune	30·040	0·4	0·04

Interesting conclusions can be drawn from these facts, concerning the distribution of the chemical rays on the surface of our earth in different latitudes, and at different elevations above the sea's level. The further removed a situation is from the level of the sea—the higher up in the atmosphere it is placed, the greater amount of chemical action it will receive. Thus, in the highlands of Thibet, where corn and grain flourish at a height of from 12,000 to 14,000 feet, the chemical action of the direct sunlight is 1½ times as great as in the neighbouring lowland plains of Hindostan. In the same way we can calculate for any point of the earth's surface whose latitude is known, the amount of chemical action which the direct sunlight effects at any given time of day or year. In Table IV. the numbers represent

TABLE IV.—*Chemical Action effected by Direct Sunlight in one Minute on the Vernal Equinox at*

A. Melville Island.
B. Rejkiavik, Iceland.
C. St. Petersburg.
D. Manchester.
E. Heidelberg.
F. Naples.
G. Cairo.

Hour.	A.	B.	C.	D.	E.	F.	G.
A.M. P.M.							
6 or 6	0·0	0·0	0·0	0·0	0·0	0·0	0·0
7 or 5	0·0	0·02	0·07	0·22	0·38	0·89	1·74
8 or 4	0·07	1·33	2·88	5·85	8·02	13·31	20·12
9 or 3	0·67	6·62	10·74	18·71	23·99	35·88	50·01
10 or 2	1·86	13·27	20·26	32·91	40·94	58·46	78·61
11 or 1	3·02	18·60	27·55	43·34	53·19	74·37	98·33
12 at noon.	3·51	20·60	30·26	47·15	57·62	80·07	105·3

the chemical action effected by direct sunlight in one minute at the places and hours named on the 21st of March. Curves were exhibited, showing the rise of the action, with the progress of the sun through the heavens. By comparing the numbers in the table, it is seen how greatly this chemical action differs at various points on the earth's surface; and we can understand how it is, that in the latitude of Cairo, where the chemical action of the direct sunlight is twice as great as it is in that of Manchester, the whole flora and fauna assume a more tropical and luxuriant character.

The speaker stated, that he was only able briefly to notice the principles upon which the new mode of measuring the chemical action of light depends; adding one or two illustrations of the measurements actually made. He was unable even to refer to one of the most interesting and important applications, viz. the measurement of the chemical action effected by the diffuse daylight. This has, however, been accomplished, and we are now able to calculate the amount of chemical action produced by both diffused and direct solar light, on a cloudless day, at any place situated above the latitude of Cairo. The following table shows the results of such a calculation.

TABLE V.—*Total Chemical Action effected by the Solar Rays from Sunrise to Sunset on the Vernal Equinox at*

	I.	II.	III.	IV.
Melville Island ...	1196	10590	11790	1306
Rejkiavik	5964	15020	20980	2324
St. Petersburg......	8927	16410	25340	2806
Manchester	14520	18220	32740	3625
Heidelberg	18240	19100	37340	4136
Naples...............	26640	20550	47190	5226
Cairo	36440	21670	58110	6437

I. Gives the action of direct sunlight in degrees of light.
II. Gives the action of diffuse daylight in degrees of light.
III. Gives the action of total light in degrees of light.
IV. Gives the action of total light in light-metres.

Knowing the intimate connexion of the chemically active solar rays with the plant- and animal-producing power of a country, no one can doubt the immense importance of the establishment of a regular series of measurements of the variations of the amount of these chemical rays at different situations on the earth's surface. Such a series would open an entirely new field to the science of meteorology, and would reveal to us relations and points of difference as regards the chemical climate, at present wholly unknown.

The chemical photometer, in the hands of an experienced experimenter, is a perfectly accurate and extremely sensitive instrument; and the method described is a most valuable one for scientifically investigating the primary laws regulating the chemical action of light, and the distribution of the chemical rays. It is, however, not capable of universal application

as a meteorological instrument, owing to its complicated nature, and the great care requisite in its management. At present we know of no easy, and at the same time correct, method of estimating the chemical action of light. Much time and labour has already been spent by the authors of the method described in endeavouring to prepare an instrument which can be practically used for this purpose in meteorological observations. Persevering in their efforts, they hope ere long to overcome the numerous difficulties which beset the subject, and to describe a method which shall answer the proposed end.

The Mission of Photography.

As the human mind can never attain a knowledge of OMNI-*science*, so indeed can it never predict the ultimate uses and applications of our beautiful science of photography.

The reveries and day-dreams of Daguerre, Nièpce, and Fox Talbot must of necessity be pregnant with bright visions of the future high mission of photography, of the most gratifying description.

When Benjamin Franklin discovered his system of lightning conductors, and his paper was read before the Royal Society, it was received with peals of laughter, and was voted so absurd as to be deemed unworthy of being printed in the 'Philosophical Transactions.' It was, however, printed by an independent publisher, and attained a world-wide celebrity. The invention has since been the safeguard against lightning upon land and sea. Glorious Benjamin's brown studies led him actually to electric telegraphy, not merely theoretically; for he sent sparks across the Schuylkill without any other conductor than the water, and thus fired spirits in which were drunk the healths of all famous electricians in England, Holland, France, and Germany, at a feast for which the turkey was killed by the electric shock and roasted by the electricity jack; the event was celebrated by the discharge of guns from the electrical battery,—all of which he spoke of in a letter to the Secretary of the Royal Society. Thus Franklin was a benefactor to his race; for he converted one of the most mysterious, dreaded, and dangerous powers into a realization of our infant ideas of fairies who could convey messages from here to Timbuctoo and back while we winked our eye—of gnomes who could go down into the depths of the earth or sea and blast rocks, or perform other services beneath our feet—of invisible spirits who would convert themselves into a motive power; and we are not quite sure if he did not also realize our spirit of light in his adaptation of electricity; but of this we can find no record.

Who shall predict the ultimate uses and applications of our beautiful science of photography? Who knows the extent of the grasp of the future in the fertile imaginations of Daguerre, Nièpce, and Fox Talbot? O that we possessed their pleasures! for there is a nobleness in the power which the natural philosopher derives from the discovery of nature's laws, of raising the curtain of futurity and displaying the decrees of Nature so far as they affect the physical universe for countless ages to come, which is independent of and above all utility. While, however, we thus claim for our great benefactors in photography all the consideration to which on their own account they are entitled, and while recollecting that they are indebted to the Rosses of optical science, it must be understood that we do not intend to disparage the minor workers, but great benefactors of the human race, who, working in their fields of science, draw from them the great benefits which so much tend to the well-being of man. When we express the enjoyment which arises from the beauty and the fragrance of the flower, we do not the less prize the honey which is extracted from it, or the medicinal virtue which it yields.

It is known to all who take an interest in physical science, that the most important laws which prevail in atmospherical and terrestrial phenomena are intimately related to the horary and diurnal variations of the barometer, thermometer, hygrometer, the declination-needle, dipping-needle, and, in fine, to the changes which continually affect all those delicate and sensitive instruments which the skill and genius of scientific men have contrived to indicate the succession of meteorological phenomena manifested around us. It is as well known that to obtain a perfect record of the indications of these several instruments, it would be necessary that an observer should be stationed at each of them continually night and day, in all seasons, to note down their changes, which are continual, and sometimes sudden, such as cannot be foreseen or anticipated; moreover, that these changes are in some cases so rapid and fleeting, as to be incapable of exact estimation or measurement, even by the most vigilant and practised observers. Yet we may be excused for saying it is not so well known to many of our readers as it might be (we may perhaps say, as it ought to be), that photography has intervened to effect that which hitherto without its aid has been beyond the ability of man.

The Great Exhibition Council Medal of 1851 was obtained by Mr. Charles Brooke, of London,

for an automatic apparatus which made all the *above phenomena keep a constant and unerring record of themselves in* PHOTOGRAPHIC WRITING.

Without attempting a detailed description of this very beautiful automatic apparatus, which, besides, could not be made intelligible without several complicated drawings, the general principle by which its indications are made may be briefly and clearly explained.

A pencil of light, brought to a focus by spherical or cylindrical lenses or reflectors, is so governed that its point or focus has a motion identical with, or bearing a known proportion to, the motion of part of the instrument which affords the indications to be registered. Thus, if the instrument be a magnetic needle, the axis of the lens or spectrum is made to coincide, or make a known or constant angle, with the needle, and therefore to participate in its movements. The focus of the pencil refracted or reflected receives a corresponding motion. If it be a column of mercury, as in the case of a barometer or thermometer, the direction of the pencil of light is varied, either by means of a float, which rises and falls with the mercurial column, or by transmitting the light through the tube, so as to produce the shadow of the column, in which case the movement of the shadow will be registered.

The focus of the luminous pencil is made to fall upon a sheet of photographic paper; and if both it and the paper were stationary, a spot would be produced upon the paper at the place where the focus falls upon it. If, owing to the variation of the instrument whose indications are to be recorded, the focus of the luminous pencil moves, a line will be traced on the photographic paper, the length of which will bear a known relation to the variation of the instrument. Thus, if it be a magnetic needle, a variation of one degree east or west in its direction, may impart a motion of an inch right or left to the focus of the luminous pencil, and a line of corresponding length would be traced upon the photographic paper. But by this means nothing would be recorded, except the extreme variation of the needle in a given time. An observer would still be necessary; and nothing would be accomplished more than is already attained by the self-registering thermometers, which show the maximum and minimum temperatures indicated during a given interval.

The apparatus is, however, rendered perfect by rolling the photographic paper on a cylinder, which is moved by clockwork, so that a known length of the paper moves under the focus of the luminous pencil in a given time. When the focus of the pencil is stationary, a straight line is traced on the paper in a direction at right angles to the motion of the paper, and therefore parallel to the axis of the cylinder; but when the focus moves, as usually happens, to the right and left alternately, an undulating curve is traced upon the paper, the distances of the points of which from a known base line (also traced upon the paper) show not only the particular minute and second at which each change took place, but the actual state of the instrument at that moment.

In this way the heights of the barometer and thermometer, the variations of the declination and dipping needles, the directions of the wind-vane, and, in fine, the indications of all other meteorological instruments are faithfully and continually registered, from minute to minute, and from hour to hour, by night and by day, in summer and in winter, and in all positions which it may be necessary to give to the instrument of observation, whether on the summits of lofty towers or mountains, in the caves of the observatory, or in the workings of mines hundreds or thousands of feet above or below the common level of the surface, in the absence and independent of any other care or interference on the part of an observer, save that which is necessary from time to time to supply this ever-wakeful and ever-active scribe with a fresh supply of paper. An apparatus constructed in this manner has been adopted for registering the meteorological indications of the instruments at the Royal Observatory at Greenwich, with the greatest advantage. Since its introduction, the staff of observers has been reduced in number, and the fatiguing process of nocturnal observation has been altogether superseded.

Father Beccaria, of Piedmont, in the exercise of his versatile genius, after years of laborious study and observation, discovered that wet or dry weather was undeviatingly preceded by a vitreous or resinous electrical condition of the atmosphere; but it is almost impossible, even in the highest flights of his speculative imagination, that he could have contemplated photography bridging the chasm of communication between the atmospheric electricity and the mind of man; and yet we are happy to inform our readers that this is now being done. We have been favoured with an inspection of a beautiful apparatus, constructed for Kew Gardens, which is the most reliable barometer ever yet invented. By means of a wire communicating with the atmosphere on the one hand, and a very delicate electrometer on the other hand, a silvered bead, placed at the end of a thread of glass as fine as a silkworm fibre (the glass thread being the most elastic of all substances), is carried to

the right or to the left hand in the ratio of the amount of vitreous or resinous electricity. The bead reflecting a spot of light on to sensitive paper moved in the way before described, produces a permanent record of every change in the electrical condition of the atmosphere, day and night; and thus we have, by the aid of photography, Beccaria's discovery made subservient to the use of man in an extraordinary degree. As an elucidation of its use, we may mention a fact as gratifying as it will be astounding to many of our readers, viz. the day of the last celebration of our gracious Majesty's birthday was one of the succession of very numerous wet days with which it has lately pleased Providence to visit this earth. Upon that evening Professor Thomson of Glasgow was lecturing upon this electro-photographic apparatus at the Royal Institution. During the greater part of the lecture the rain was ominously pattering upon the roof of the theatre. At the conclusion of his lecture he proceeded to take an observation by the means of a wire passing through the roof of the theatre. He immediately procured a luminous pencil from the bead projecting a bright spot of light, denoting about 45° of vitreous electricity; upon which he observed that he was happy to state, for the information of those who were interested in the fact, that the rain had ceased, that there would be a fine evening, and a succession of very fine days. *From that moment, on that Friday evening, until the following Saturday week, we had not one drop of rain in London.*

We repeat, who shall predict the ultimate uses and applications of photography?

UNITED SERVICE INSTITUTION.

On Photography, and its Application to Military purposes. By Captain Donelly, R.E.

[Abstract of a Lecture delivered Friday, June 8, 1860.]

Captain Donelly wished to guard against the supposition that might arise from the title, that he proposed to bring forward any new or remarkable application to military purposes. He did not come forward as an inventor. He was not going to propose to defeat armies, destroy fleets, or take fortresses by the aid of nitrate of silver and the camera obscura. But he would endeavour to explain, as clearly as he could, the general principles of Photography, an art which was every day rapidly extending, and the aid of which might, he believed, be usefully enlisted in many secondary military operations.

Captain Donelly then went into a lucid detail of the scientific principles upon which the art of photography rests, occasionally illustrating his theories by experiments, one of which was startlingly beautiful and well worthy of notice. In exemplifying the action of light in effecting chemical changes and combinations in certain substances, the gallant Captain placed a glass bulb of about 1½ inch diameter, filled with hydrogen gas and chlorine gas, at a distance of about 6 inches from a white glass jar of about 3 inches diameter and 12 inches high, filled with oxygen gas. Into the oxygen he introduced some burning phosphorus, which, as most of our readers know, gives a vivid white light. With this kind of light there was no perceptible action on the bodies in the bulb, although if the bulb had been exposed to the action of the sun's rays, the two gases would have instantly combined, and so strong would have been their affinities, that they would have caused it to explode with considerable noise. The Captain then took a similar jar containing binoxide of nitrogen and bisulphide of carbon, to which he applied a light, which produced a bright and beautiful but evanescent cerulean blue flame, and, though burning only for the fraction of a second, in consequence of its containing more of the violet rays of the solar spectrum, instantly burst the bulb with a noise similar to the short, sharp, quick crack of the rifle, and produced a new substance, viz. hydrochloric acid. We have seen this experiment performed in other ways, but never more successfully. Professor Roscoe lately, at the Royal Institution, procured the combination of the hydrogen and the chlorine by burning phosphorus in oxygen contained in a blue glass globe; and we mention this as conclusive evidence that the union is effected by the violet rays, for the Professor could not explode a bulb when he used a white or red glass globe. So with chloride of silver. If thoroughly dry and pure chloride of silver were exposed to the action of light, there would be no effect produced; but upon the addition of moisture by water, the chlorine would leave the silver and go to the hydrogen in the water and form hydrochloric acid, the sulphur would be decomposed, and a grey substance of finely divided metallic silver would be produced ($Ag\,Cl+HO$). Captain Donelly placed some dry chloride of silver in a glass, which was unaffected by the light. Upon adding water to it and saturating some paper with the solution, the paper became coloured by the action of light. We have not room for the gallant Captain's very clear enunciation of the principles of the art, as we have more than once explained them, and as they may be read in the published Handbooks upon Photography,

such as Hardwich's, to which Captain Donelly specially referred his audience.

Captain Donelly said, with reference to the application of photography to military purposes, the first necessity is portability in the apparatus. Captain Fowke, of the Royal Engineers, who has fitted out most of the parties of Engineers that have taken photographic apparatus with them, invented a form of camera which is extremely portable, collapsing into a size that enabled it to be easily carried in a knapsack. The back of the camera was three or four times the size of the front. The sides could be detached from the front, but were hinged to the back in such a way as to allow them to fold one upon another flat upon the back. With a camera of this description, and with chemicals, &c. carried in boxes on pack-saddles, many photographs, which Captain Donelly exhibited, had been taken by Sappers, among which were pictures by Corporal Lawson, when with Captains Gordon and James, on the Asiatic boundary in Asia Minor, between Russia and Turkey; and pictures by Sergeant Church, who accompanied Colonel Stanton when he went to verify the reports on the projected Honduras line of railway across the Isthmus of Panama. Others were done in India and at Singapore. Some were taken in China, and furnished Mr. Burford with the means for his Panorama. Others were taken by Sergeant Mack at Moscow, when he accompanied Lord Granville. Two of the photographs were taken at Varna, and unfortunately the photographers of these two were lost on board the 'Prince.' Hence we see that photography can be applied under very difficult circumstances, such as on long and rapid journeys, and that, in fact, the photographer could accompany the army in the field, and that the art could be learned and practised by the men. Many of the photographs were certainly not such as Mr. Fenton or Mr. Thurston Thompson would care to exhibit at the Photographic Exhibition, yet still some of them were very good as photographs; and all of them Captain Donelly thought very creditable, when he considered the circumstances under which they were executed.

Photographs of country give a most truthful and accurate idea of it; they do more to give a correct idea of any particular position than yards of description on foolscap. They might be found of great service in illustrating a report on a country, as, indeed, they had been employed by Colonel Stanton; and in this way they might be of service to a general commanding an army in the field.

. Photographs were also available in copying and multiplying plans,—as in the case of a plan, which was produced, of the position of the ships for landing the troops in the Crimea.

Captain Donelly produced a number of photographs which had been executed at Chatham, affording an admirable means of conveying descriptions of various operations (bridge-making and so on), giving perfect ideas of place. Photographs are of great service in supplying engineers with a ready and rapid means of showing the state of works on a particular day. Captain Donelly exhibited a progress-plan of the works at Aldershott, which was done for the War Department, by which it could be seen at once how far the works had got on, which could only otherwise be done by expensive lithographs, and then not so well.

We are enabled to obtain a perfect picture of any size we wish; and Captain Donelly thought he could not give a better example of that than the five photographs of the cartoon in Hampton Court Palace of Elymas the sorcerer struck with blindness. These five photographs were of the respective sizes of 8×5, 15×11, 23×15, 31×21, and 48×30 inches. It might, perhaps, be suggested that they had little to do with the application of photography to military purposes; but Captain Donelly produced them as admirable specimens, executed, with the assistance of the men of the Royal Engineers, by Mr. Thurston Thompson, who had instructed most of the Royal Engineers at the South Kensington Museum.

Lastly, Captain Donelly called attention to the application of photography to the reduction of the maps on the Ordnance Survey from one scale to another for engraving. By employing photography for these reductions, the Survey Office at Southampton saves £1600 per annum; and the whole saving on the Survey will be about £32,000, and this with increased rapidity and accuracy. Formerly the reductions were made by the pentagraph—a long and tedious operation, in which, as the hand and eye were employed, the accuracy was dependent, to a great extent, upon the skill of the operator. Now, by merely fixing the camera at different distances from the plan to be copied, it can be reduced to any scale desired, by an operation of a few minutes, and with the greatest accuracy, a detail of which appeared in a late Number of the Journal.

The 10-feet plan is reduced to 25 inches, and the 25-inch to the 6-inch by photography. But in reducing from the 6- to the 1-inch scale, the perfect truthfulness of photography militates against it—the photograph is too crowded with details, so that at present, in a portion of this operation, the pentagraph is still employed. The photographs are at once transferred to the copper plates for the engraver, or the zinc plate

for the zincograph process, of which Captain Donelly exhibited several specimens. Instead of printing from the negative on to ordinary printing paper, printer's tracing-paper is employed, sensitized by being washed over with a saturated solution of bichromate of potash and gum-water. This prepared paper is exposed to light under the ordinary glass negative, and the portion of bichromate of potash acted on becomes insoluble in water and does not change its colour: this is a peculiar property of bichromate of potash. The print is then placed face downwards on a metal plate covered with the greasy lithographic ink, and passed through a press, until it becomes almost black in appearance. It is then washed with a solution of gum-arabic and hot water, and brushed with a camel's-hair brush; this removes the portions not acted on by the light by dissolving the bichromate of potash, and leaves a print of a light-brown colour in lithographic ink. This can be either transferred to the copper plate, as a guide to the engraver, by burnishing, or it may in the same way be transferred to the zinc plate, and printed from immediately, without any further process, by simply being inked with printer's ink.

CORRESPONDENCE.

All communications for the 'Journal,' and on business relating to the Photographic Society, may be addressed to the Secretary and Editor at Messrs. Taylor and Francis's, Red Lion Court, Fleet Street, E.C.

The Rooms lately occupied by the Society at No. 1 New Coventry Street, W., are now entirely closed.

The length of the Report on the Present State of our Knowledge regarding the Photographic Image, by Messrs. Maskelyne, Hadow, Hardwich, and Llewelyn, which it has been thought advisable to conclude in the present Number, being the last of the volume, compels us to postpone until our next some correspondence which otherwise should have appeared.

Mr. Rothwell has kindly sent us a communication, with illustrations, "on the Apparently Incorrect Perspective of Photographic Pictures produced by lenses of different focal lengths, as usually viewed or looked at," &c. This paper will be read at the first Meeting of the Photographic Society; and as Mr. Rothwell is desirous that gentlemen should come prepared to discuss the merits of the subject on which he treats, the Editor will be glad to forward a proof copy previous to the Meeting to any interested in the subject.

R. D. and J. Y. Photo-zincography.—Several minor details will be explained in our next.

A Beginner.—For positives, it is requisite that the glass should be of good colour and free from blemishes. For negatives, flatness is the great desideratum; slight defects in other respects are of little import.

Niger asks for the address of the maker of "Bates' Black Varnish," a preparation we have never met with. Black lacquer answers the purpose exceedingly well, and may be obtained at almost any dealer's.

J. H. S.—A blue sky with white rolling clouds can be taken perfectly with a stereoscopic camera in the way you mention; the exposure should be instantaneous, a small diaphragm being used. The development should be carried rather far and intense for good printing-effects.

Engineer.—Sugar of milk mixed with the solution for salting papers certainly adds to the activity of the paper, and the prints have a peculiarly soft mezzotinto-like look when so produced. We do not know that it adds to the permanence of the impressions; no doubt the photographic image will fade from some specimens of paper, do all you can to prevent it.

B. W. (*N. B.*).—Use a glass bath; they may be procured at any of the dealers'; we have purchased them very cheaply at Palmer's glass warehouse, St. Martin's Lane. You will find it far more satisfactory to use porcelain dishes than common earthenware for solutions requiring to be kept pure: we procured, some years since, a set from Messrs. Bourquin, of Newman Street, made of the white French porcelain, perfectly flat at the bottom; and they remain without a stain, as perfect as when first made.

Senex (*Norwich*).—We believe that the salts of cobalt have been tried in the practice of photography in the way you mention, but we have no actual experience; a letter addressed by you to Mr. Hunt at the Geological Museum, Jermyn Street, would elicit the information.

Calotype (*J. W.*).—In making the double iodide solution for the paper, pour the nitrate-of-silver solution into the solution of iodide of potash and stir it well. A darker-coloured iodide of silver is produced this way than by the reverse.

A Constant Reader.—Nitrate of silver bears but a small remunerative profit to the dealer. We cannot recommend you to purchase it at the low price you name. Depend upon it there is something wrong somewhere — dishonesty or adulteration. We have met with chloride of gold, so called, such as you describe. Mr. Hardwich's formula is very simple; but as we can always purchase it genuine at Messrs. Bland and Co.'s, Fleet Street, or Murray and Heath's, and other similar establishments, we think you will do well to follow the same plan. Your time should be of more worth than the trifle saved.

Photo.—If we have a prejudice (as you say) against the use of cyanide of potassium, at least we speak from experience and observation. Mr. Robinson, of Leamington, one of the most successful and experienced photographers who has ever yet practised the art, will, we are sure, tell you his own suffering from the use of this salt.

Perambulator.—Sutton's wheelbarrow tent is the article you should possess for such an excursion. You had better address that gentleman, at Jersey.

Letters of inquiry to the Editor can be answered only through the medium of Answers to Correspondents.

All Communications for the Journal should be addressed to the Editor, at the Publishers', Messrs. Taylor and Francis, Red Lion Court, Fleet Street.

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N.B.—A dash rule represents the *italics* immediately preceding it. When *d.* follows a person's name, it refers to a discussion in which he has taken part.

THE END OF THE SIXTH VOLUME.

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